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BIRDS of the MIDNIGHT SUN

By ARTHUR C. TWOMEY

AN ICY SNOW drives out of the Arctic Ocean in great gusts of wind. Dark, yellowish, moisture-laden clouds race over the sky—casting a picture of winter over the June day. Across the frozen river rises the rocky headlands of Buttons Bay, sloping off to the northward in a low, barren strip of sand and rock. Upon this point the stern gray outline of old Fort Churchill, for a century a far flung outpost of civilization, is discernible. Far to the south a hazy line tells of the last remaining fringe of the great transcontinental coniferous forest as it merges into nothingness on the vast Arctic tundra. A low line of gray, age-worn rocks, a vestige of the Precambrian shield, sprawls along the eastern coast of Hudson Bay. To the north, ice—pressure ice—stands out in white, rugged contrast to the grim shore line and extends in every direction, only to be swallowed up in the unknown of the great wastes. Such is the early June scene that welcomes the feathered hordes that have winged their way thousands of miles from the warmer climes of the south.

But, should one suddenly step into this picture, a new world would be born out of the winter blast, for birds are everywhere, singing their courtship songs and clad in their gayest dress. A parasitic jaeger, like a swift pursuit plane, quickly overtakes an Arctic tern that reluctantly gives up a morsel of food to his traditional enemy. In a small puddle of water on the edge of a frozen lake one may see northern phalaropes as they twirl like tops, stirring up the minute animal life which they pick up as they complete their dizzy spirals. A dainty, spindle-legged little wader suddenly flies up and, as he ascends in a long swoop, starts his "ogally-ogally-ogally"—the song of the stilt sandpiper. Near him a beautiful Lapland longspur with his gay plumage of black, brown and chestnut collar patch, soars far upward and then descends into the wind with slow, fluttering spirals as he gives forth his melodious song to a drab-colored mate who already is building her nest in a sheltered nook on the leeward side of a boulder.

In the distance one can hear the wild laughter of a flock of snow geese as they travel high —they are nearly over-due at their distant Arctic islands hundreds of miles farther north. On a lone rock a short distance away a willow ptarmigan, the grouse of the tundra, struts in his new plumage, though not yet fully deprived of his immaculate winter feathers. One is brought back to the memory of the green fields of the south as the notes of a native wagtail, the American

Many readers, both in our recent editorial questionnaire and in letters, have urged a better proportion between pictorial features and articles with illustrations. We have studied this question carefully, weighing mechanical as well as editorial considerations. The answer seems to lie in using rotogravure sections in alternate months, supplanting this section with sixteen pages of illustrated articles every other month. This represents some additional production costs but seems to be much desired. Next month will be, therefore, a "rotoless month". August will have rotogravure again, and so on.

DENIZEN OF THE NORTHERN SWAMPS

The semi-palmated sandpiper guards her nest of four chestnut-blotched eggs situated in the damp, spongy mosslands of the north

pipit, in full nuptial song, come floating down to the snow-covered ground.

But why all this great activity, the songs, the gay feathers, the varied and elaborate dances as the birds display their bright plumages? It is because they have returned once more to their paradise, the nesting grounds of the north. Many have travelled thousands of miles, covering great continental masses; others have come but a few hundred miles. The little Arctic tern that screams over-head as it dodges the jaeger has indeed travelled far since he came into existence last summer on a little, rocky island only a mile or more from the coast. In early fall he had left with the members of his kind drifting ever southward. His long, slender, white wings always in motion, seldom stopping to rest, had carried him across thousands of miles of ocean down to the Antarctic circle. There he had spent the winter; but, as a new spring approached in his Arctic home, he felt an urge to start north once again.

But now he is here—the bird of the midnight suns—back safely to the islands where, far from the inroads of a modern civilization, he can seek out a mate, choose a nesting site, and raise his family of two or three downy, tan or gray-black, marked chicks. The short season makes it necessary for him to be busy and brave in the face of the hardships of the early spring so he can prepare his family for that long fifteen-thousand-mile trip which must be taken before he can greet the midnight suns of another Arctic summer.

In this throng of feathered creatures there are many other birds that have travelled far during the past winter months. Golden plovers race over the tundra, their outspread wings displaying their black breasts and throats and setting off the flakes of gold adorning their backs. Or they may rise a few feet above the ground on vibrating wings with a loud, continuous clatter of notes as they court their lady-loves. Soon enough their golden-blotched downy young will be with them to complete the family, but the adults become restless long before the young are ready. As the short summer wears on, the young suddenly find themselves alone; their parents have gathered and started eastward. The adults travel across Labrador and then down the Atlantic Coast where other flocks join them. Flying through the air like bullets, their plaintive whistles penetrate the stillness as they pass. They must keep moving, for the inward urge that carries them on across two thousand miles of ocean to the Brazilian coast of South America and then on to the vast Pampas of the Argentine will not give them peace.

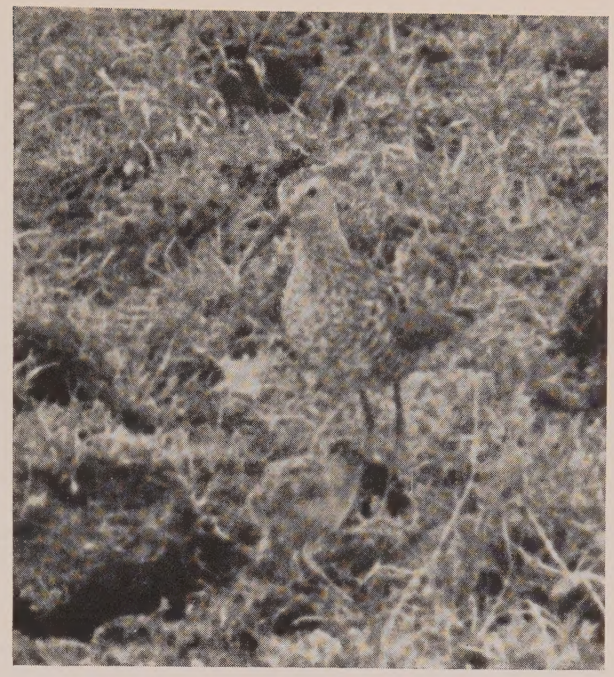
But what of the young that they so casually left stranded on the Arctic tundras? Yes, they find food and shelter, and complete their development, so that by late August they too have experienced an overpowering desire to move south into a vast continent, a new world to them. Without guides, with only that compelling inner force to lead them, these little birds in their gray, immature plumages move south. They take a shorter route than their parents and, in large flocks, travel down through the great plains of North America. Thus this second army passes; and, by January or February, they ultimately join their parents in the Argentine. One can image the excitement of reunion as the new flocks arrive! But their stay is brief, for a new force drives them north as another spring approaches. And so parents and offspring leave together and travel north across South America and over the Great Plains, following the route taken by the southward migration of the young. Once again, they arrive at their true Arctic homes. Similar migratory feats are being performed yearly by many of our birds, bringing the thought that this man-

AN ARCTIC INFANT

He is a bit young yet, but within a few weeks this baby Arctic tern will begin his globe-trotting

AN EXAMPLE OF NATURE'S COLORING

A downy stilt sandpiper, hardly discernible because of his protective coloring, takes his first steps in a new world while proud father watches approvingly



made civilization is but a moment in the life of the universe.

The scene changes and it is the middle of June at old Fort Churchill. The sun sets but for an hour or so, the snow is gone, the lakes are clear blue mirrors, and the river breaks up with a great rumble as tons of ice grind and churn their way out into the Bay that is still filled with ice floes near the shore. Great icebergs move back and forth with the shifting winds and tides, giving a view of long leads of bluish-green water and emerald-green, pink, and blue animated shapes of great ice blocks. In these leads one can see the glistening backs of the white whales as they come up to blow the spume and to gulp in oxygenated air, and upon the ice floes one may discern herds of seals basking in the sun. The air is full of the calls and screams of sea birds; a mixed flock of Arctic terns, Bonaparte's gulls and herring gulls pick up food from the surface of the water. The parasitic and long-tailed jaegers are ever present, swooping in among the flocks of gulls and terns to deprive them of their food. Both Pacific and red-throated loons wing their rapid flight in and out of the mouth of the river or far out among the ice floes, from where their weird laughter floats back on the breeze. And, amidst it all, race innumerable white-winged scoters—their ebony bodies in marked contrast with the scene.

Inland, still another scene presents itself. The tundra is drenched in moisture; the gentle rolling hills are clothed in the dark green of sphagnum moss and the light green of reindeer lichens. Already, in the space of a few days, the green of the mounds and hills are splotched with splashes of pink as the rhododendrons begin to blossom. Then too, the beautiful *Dryas,* or Arctic heather, which grows here in profusion, casts over this wonderland a sprinkling of white. It is into a land of sudden beauties, in evidence even before the snow and winter blasts have gone, that our birds come. Life at its best is fast and short here; a lifetime crowded into the short space of a few weeks. It is little wonder that the birds migrate quickly and hasten their mating; for now, in this brief spell, all life is at its highest pitch everywhere. Most of the birds have eggs in their nests. The males are in their brightest plumages and continuously sing their wild, sweet music. Suddenly all is still! A Lapland longspur side-slips under a boulder within hand's reach and, crouching low, watches a tragedy that might have been his own. For, like a thunder-bolt, a duck hawk comes out of the sky and snatches a horned lark within ten feet of the hidden longspur. As he passes on out of sight with his luckless victim, the world comes back to life; the singing goes on. The loss of that timely little song of the horned lark is unnoticed, for there are many more to take his place. Such is life and death in the Arctic.

The long days have become warmer. The birds still sing, but there seems less profusion of song—the young are beginning to hatch. Out on the long point, on the east side of the river, many birds have nested. On the open gravel ridges dozens of semi-palmated plovers have laid their eggs. In the damp, spongy moss of the low depressions a large number of least and semi-palmated sandpipers have hovered over their four cream-colored, chestnut-brown blotched eggs—and some have already hatched. In the moss carpets, under the recumbent Labrador tea, under rocks, or out on the bare dry tundra, the Lapland longspurs, horned larks, and American pipits have built their nests, lined with the white feathers of the willow ptarmigan. They, too, have eggs or young.

Now the sun is low, casting a great blanket of crimson from the very zenith of the sky to its far away horizons. A sinister black cloud with a lining of the yellowest gold

SANDPIPER EGGS

Although merely laid in a slight depression in the ground, the eggs of the stilt sandpiper are well camouflaged by their distinctive markings

appears in the northwest. As the twilight of the Arctic night envelops all, the cloud becomes menacing and soon a storm is brewing. The death-like silence, broken only by the occasional twitter of a sandpiper or the far-away call of a curlew, is shattered by a crash of thunder and a long, dirty-white cloud breaks out ahead of the tempest. Then in a deafening roar the storm breaks with all its fury—a hail storm, devastating to all unsheltered life. Although it lasts but a half hour, the ground is covered with icy missiles. Fortunately the storm is brief and struck only the point and now moves out to sea. But what of all those unprotected nests of the feathered creatures?

In the morning the birds of the tundra will be singing and as active as ever, but off towards the point only the wild music of the American pipit and the melodious song of the white-crowned sparrow will be heard. What will have happened to the rest of the songs? Here and there over the bare gravel ridges battered little clumps of feathers that only the day before were the free, living spirit of the wilds will be found. But under each body the four partly hatched young still will be alive and warmed by the last remaining heat given off from the body of their staunch little parent. What, in the animal kingdom, could be more appealing? It manifests that inborn maternal force that compels even the bird to protect its young—even to the sacrifice of its own life.

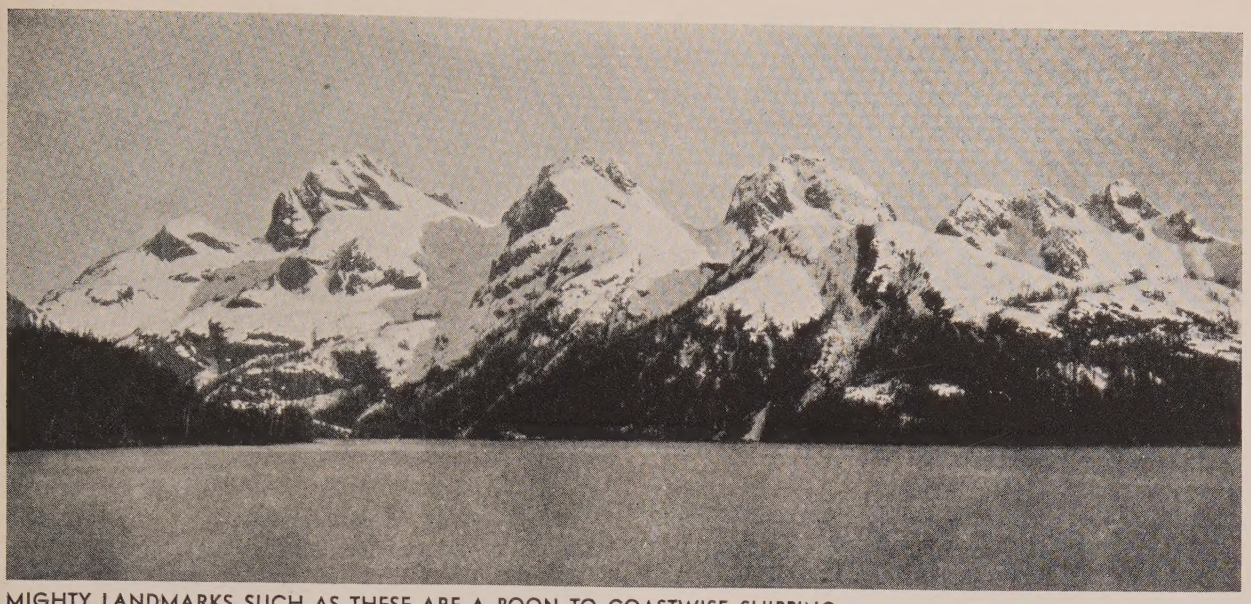
But time is short. Soon the Arctic gales will be blowing out of the north polar seas. The birds sing but little now. The Lapland and painted longspurs have already begun to molt, and their drab winter plumage is appearing. All of their energy is now fixed on one purpose—the feeding of their young and preparing themselves for the long southward migration that will take them to the opposite end of the world.

FLORA OF THE NORTHLAND BREEDING GROUND

The beautiful *Dryas* or Arctic heather covers the tundra with its snow-white blossoms

TEACHING CONSERVATION

Some time ago we announced a plan to publish a special American Nature Association bulletin designed to assist the teaching of conservation as a school subject. There have been inevitable delays in connection with this but the bulletin is now available to members of the American Nature Association for a three-cent stamp to cover mailing, and to others at twenty-five cents a copy. It may be obtained from the American Nature Association, 1214 16th Street, Washington, D. C. The title is "Teaching Conservation", and it is Conservation Bulletin Number 3. This 32-page bulletin is not designed to present a course of study but to be generally suggestive of methods and of inspiration to teachers.



MIGHTY LANDMARKS SUCH AS THESE ARE A BOON TO COASTWISE SHIPPING

These mountains, visible far at sea if the weather is clear, guide the mariner along his way. Their counterparts, hidden beneath the vast expanse of the ocean, when properly charted, provide a like service for the modern mariner no matter how bad the weather or how far he may be from land

GUIDEPOSTS OF THE SEA

The great need for charts of submarine "landmarks" to insure safety to shipping is being met by the U. S. Coast and Geodetic Survey

By ELLIOTT ROBERTS

LET'S place guideposts along the highways of the sea. The great ships of the world, carrying their countless precious human lives and their millions in cargo, are too much a part of our living, too essential to our civilization, to wander aimlessly at the whim of the elements. They need the best possible guidance. Let's unshroud the mystery of the trackless wastes, even as we have placed direction pointers, mileposts, and warning signs to guide the motor craft that thread our inland highways.

No night is too dark or stormy, no place too remote, but that the wandering motorist, with road map and highway marker, may locate himself and direct his way. We must bestir ourselves in behalf of the shipmaster, that he may have like protection. The means are at hand; the need a crying one.

There is a remarkable technique of nautical astronomy, but the rain and fog come all too often, obscuring those shining beacons, the sun and moon and stars. The spinning gyroscope tells direction with beautiful accuracy, but it cannot show the mariner where he is. Radio direction signals continuously flash out their guiding messages, but the elements come to blot out and distort these friendly voices of the air. The charts on every navigator's plotting table are rich with detailed information of the coastwise regions; on the high seas of the deep-water sailor they are at best rough sketches of what lies below.

All too common, even with our modern knowledge, are the times when storms come to harass the careworn shipmaster. His ship, despite all his best efforts, may be blown far from her course, into strange and dangerous places. His concern at such a time must be laden with the knowledge that he is lost, and that the very fury of the elements that drove him astray will obstruct his every effort to find his position. His perplexity and anxiety overwhelm him. Then is when he needs, most desperately, the guidance of a signpost.

The mariner has landmarks in view while running close inshore. The capes and headlands, the mountains and up-thrust little islets, all are guideposts to the coastwise pilot, showing the familiar way. Out on the expanse of the ocean there are no headlands and mountains. The mariner must watch them sink into hazy obscurity astern as he directs his way to distant places.

It is our job to give him landmarks along the way, never failing him along the thousands of lonesome miles. When we have thus fortified him a new day will truly have dawned in the annals of seafaring; gone will be another of its perils.

There *are* landmarks hidden under the watery expanse of the oceans. The mountains and valleys, the cliffs, plateaus, and abysses of the ocean floor are just as real

and can be just as helpful—just as much the guiding mark—as any jutting headland.

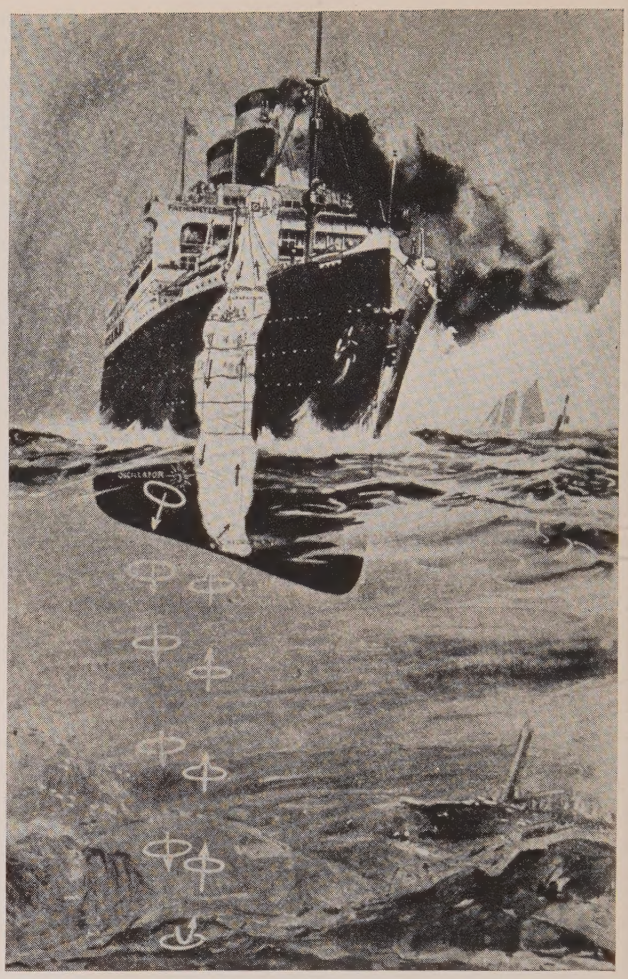
We have already given the mariner means to sense the unseen submarine features that can be such a guide to him. That wonderful invention, the sonic sounder, is already his. With it he may instantly measure the distance to the nearest solid ground, the sea floor. Without interrupting his progress in any way, without even putting anything in the water, he may sound out the depth at will. As he moves along, keeping watch of the shoalings and deepenings of the water, he has a vivid and true picture of the everlasting underwater landmarks.

But one thing is lacking—the complete and accurate chart to show the locations of these landmarks, hence his own position on the sea. Just as the motorist needs his road map to plan a trip, so does the mariner need his ocean map, the chart. The submarine landmarks must all be located and delineated on the charts, so that they may be identified from the results of the mariner's soundings, thus telling him where he is.

For many years there have been accurate detailed charts of our coastal regions. The more modern of the ships, equipped with the sonic sounder, have learned how to watch their depth as they come up to the shallow waters of the coast, finding their positions with reassuring regularity. The chartmakers in recent years have striven, with all their ingenuity, to make accurate charts farther and farther seaward, that the ships may make more of this valuable service. Ultimately desirable is the charting of much of the ocean area of the world.

Just as our material progress has always had to depend on scientific achievement, so has the hope of fulfillment of this ambitious dream had to wait on recent developments in the science of oceanographic surveying. One great stumbling block was overcome with the finding of means to sound instantaneously in the ocean depths. Another marvelous device now in use by the surveyors can send an underwater sound signal hundreds of miles, measuring the distance according to the time of transit. At one stroke this advance has done away with the need of sighting upon shore beacons for the determination of positions in ocean surveying. Not only is the working area pushed many times its original distance out from the coast, but progress is no longer limited to times of daylight and clear weather. Successive distances from buoy to buoy have been measured in this way, and whole networks of triangulation established across the open sea.

During three recent summers, parties of the United States Coast and Geodetic Survey have made a new survey of Georges Bank, two hundred miles off the Massachusetts Coast. This is a part of the area made famous by the fishermen of Boston, Salem, and Gloucester since the beginning of American history. The new chart was made possible only through the latest survey methods. It is of immense material advantage to the fishing folk, who need the best possible knowledge of such a formation, yet there is a greater and far more valuable application of



FINDING THE DEPTH BY ECHOES

The ship sends out an electrically produced alarm from its hull and catches the echo, bringing back its message of depth or shallowness, as it is reflected from the floor of the ocean

the knowledge. Charts are needed for the guidance of all.

In the survey of Georges Bank, guideposts of the sea were established. In particular, there was discovered a prominent submarine valley, a veritable gorge in the southeast slope of the bank. It had been missed completely by the earlier surveys, performed years ago by means of astronomic navigation. It lies across the westbound steamer track. The liner, coming up to our coast on the last stretch of her dash across the ocean, starts her electric sounding instrument and watches for the sudden variation that marks the deep water of the gorge. Instantly she knows her location, though she may have been in fog for days. The record of the sounder, when compared with the new and accurate chart, gives her a perfect new departure. She can now proceed confidently to make the expected landfall, warned from the dangerous shoals among which she might otherwise have run.

The highway markers and signboards are everywhere along our roads. The next great job of the chartmakers is to give the mariner *his* guideposts, the underwater landmarks made clear by electric and sonic "eyes", so that he will always be "on bearings", and in touch with known objects. When this is accomplished there need be no more fumbling of the way.

Accurate charts must be made to cover the oceans.

First should come the charting of the main steamer lanes, then we may turn our attention to the byways and backwaters that are the particular domain of the wandering tramp steamers and little craft, here, there, and everywhere. It is well worth the attention of seafarers the world over. We of the United States must do our part, leading the way to gain the interest and attention of the other great seafaring nations, so that the project may be attacked with the resource and vigor it deserves.

It's a big job! Do you think of cost? It's not a cost; it's a saving! Consider the thousands of ships that come and go in safety because of the charts. Ships alone, aside from the lives and property they carry, are worth almost fabulous sums. If one great ship each year is saved from destruction through use of the charts, we as a nation have saved money. At no time has the annual appropriation for the entire charting work of the country ever approached the value of even one of these biggest ships!

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The Nuptial Dance of the Nereis

By MURIEL LEWIN GUBERLET

TONIGHT MARKS the most important event of the year on the social calendar of the nereis worm. Between the hours of eleven o'clock and midnight the socially prominent nereid débutantes and bachelors will gather at the beach for their annual nuptial dance.

For the benefit of the layman it may be well to explain that this nereis worm, *Nereis agassizi,* is a relative of the garden earthworm. It is a tiny creature one and a half to two inches in length whose body is made up of approximately 130 segments. On each segment are paddle-like appendages. It has four pairs of feelers, two pairs of eyes, and a pair of hooked jaws on its head.

Just once during its lifetime is this little creature lured from its home at the bottom of the sea to see the world. For 364 days it lives prosaically in a tube made of mucus, not even leaving it to secure food. When hungry it crawls part way out of the tube and stretches and squirms in all directions, grasping diatoms, protozoa, minute bits of seaweed and small crustacea. A terribly dull life, we think, but maybe nereis worms have a radio network to keep themselves informed of the gossip of the worm world.

THE NEREIS WORM
A many segmented creature resembling the earthworm but being less than two inches long

But even worms can not resist the romance and the glamor of the moon and so, during the months of June, July, and August at full moon, thousands of nereis worms leave their mucous abodes and swim to the surface of the water. Sometimes such throngs gather for this party that they form a dense curtain a few inches below the surface.

About midnight on the night of the full moon, or a few days before, if the water is calm and the sky clear, male worms appear at the surface. Somewhat later the females begin to arrive. It always takes the girls longer to get ready for a party, you know. Quite nonchalantly the females swim leisurely about enjoying the novel experience of freedom and travel. All the while the males circle ardently about the ladies of their choice, cavorting madly to attract their attention. Shyly, at first, the females begin to flirt with their admirers, then they openly lead them on. Finally, the stimulation is so great that mere proximity or the slightest contact of the bodies of the two sexes excites the discharge of the sex products into the water. Sometimes such quantities of eggs and sperm are given off that the water becomes milky in appearance. As soon as each female has deposited her thousand or more eggs she slowly sinks down to her watery grave and dies. The propagation of the species must go on and she has fulfilled her mission in life. The male may live a day or two longer, and then he, also, dies.

Culminating the splendor of passion and the pathos of death, Nature provides that the eggs and sperm promiscuously thrown into the water come together, fertilization taking place by the sperm cells penetrating the eggs. The early stages of development of the nereis worm are extremely rapid. In three weeks the tiny embryo is able to take care of itself and it sinks to the bottom of the sea, where it constructs its mucous home. New segments are added to its body from time to time until full growth is reached in ten months, and sexual maturity is attained in exactly one year.

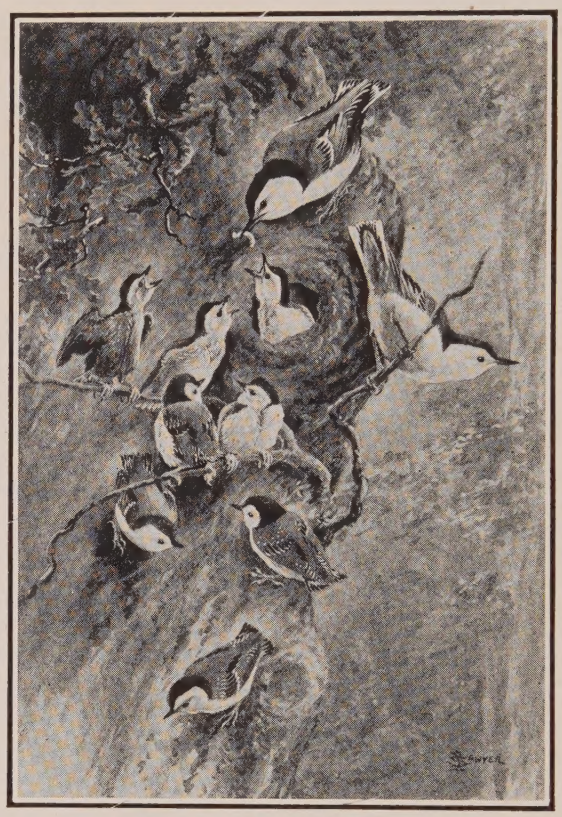
As in the preceding year, when the golden orb of the summer moon shines upon the waters of the sea, the urge comes upon the new generation of worms to break the bonds of home and to go forth to their nuptial orgy and their doom. They never forget the time and place, for it is the only eventful day on their social calendar.

A BIRD PERSONALITY

By EDMUND J. SAWYER

TO EVEN the most casual observer there is something peculiarly arresting in the appearance and manners of the nuthatch. Other visitors to the food station may come and go, but the nuthatch is always the guest of honor. Somehow, in some subtle way, this bird manages to put something of his more intimate personality into even that humdrum occupation of the food quest.

In an earlier day many of us had to make our acquaintances in the bird world unaided. Thus we can not soon forget our discoveries. Our elders knew a few of the more common birds—meadowlark; bluebird; crow; "swallow" was a vague term; "sparrow" was often a convenient excuse for ignorance, a name to cover any small bird whose real name was not known. In one of the larger gardens of the small town of my youth I repeatedly saw a bluish bird, black-capped and marked with chestnut behind the legs. He was always hitching his spiral way up or down a tree trunk. I called him the "blue woodpecker". To this day, although I know him now as the white-breasted nuthatch, my every meeting with him brings back something of that first thrill.



". . . . CREEP FROM THEIR NEST HOLLOW TO CLAMBER WITH INFANT AWKWARDNESS OVER THE HOME TREE."

Knowledge of the nuthatch's exceptional home life, his language, his friends and foes and relatives, has only increased my enthusiasm. He has built in my bird boxes, has paraded his brood before me, and, in one or other of his geographical forms, has been a regular pensioner at my food stations from New York to the Rockies. But such familiarity has not bred contempt; instead a more genuine admiration for this remarkable bird personality has resulted.

Some of the nuthatches of the Old World have, in a more pronounced degree, a habit sometimes practiced by our American species; that is, of wedging acorns and thin-shelled nuts into crevices and then hacking them open with the bill. Hence the name; "hatch" being a corruption of "hack".

The tree-creeping of these birds is rather a superficial habit. Chickadees and other titmice are close relatives for all that. Like the chickadee, the nuthatch builds in a tree cavity—which may or may not be of his own excavating—and, still like the chickadee, raises a family surprisingly large for a passerine bird; commonly of seven or eight. These youngsters are bob-tailed, fuzzy duplicates of their parents at the time they first creep from their nest hollow to clamber with infant awkwardness over the home tree.

Well content and at home as he seems to be about our gardens and homes in winter, the white-breast is pretty sure to steal away to the forest on the approach of spring. Here the nest is made and its secret guarded with a care and jealously exceptional even in a bird. The devotion of the male to his brooding mate is strikingly marked and constant. He regularly provides her with food and, when not engaged in this labor of love, he is ever at hand to detect and warn of danger. Should occasion arise he will do his utmost to lead an intruder away. I know of no other birds whose home life is more ideal.

The nest itself is usually described as made of such materials as leaves and feathers. However, I know it occasionally varies greatly from this type. One spring I watched for days a nuthatch that alternately pecked all about the outside of a bird-box, then entered the box; only to emerge, peck for a few minutes more and reenter the nesting box. I could see nothing tangible in the bird's bill, but inspection showed that the nest had been entirely made from shreds of wood-lint so fine that it was as dust-like as the fine sweepings from a carpet. Some days later I again removed the top of the box and looked in. There, a foot from my face, the devoted bird sat—and continued to sit—on her eggs! In this case eight typical eggs, white, rather thickly speckled with rich brown and lilac, were laid.

We all listen eagerly for the first robin or bluebird with its message of spring. Many associate the same glad tidings with spring's first meadowlark, red-winged blackbird or song sparrow. For that matter, the killdeer or the kingfisher may be just as early. But I always hear the glad news, and so may you, a month or more in advance of any of those traditional "spring heralds". In our northern states, February never ends before the white-breasted nuthatch responds with song to the call of approaching spring. The notes are fraught with all the vernal magic of the song of lark or thrush. The notes themselves are at once unmistakable and impossible to describe—"wher-wer-wer-wer-wer-wer-wer"—a monotone from the stark trees. It is spring's report of progress to those who understand.

Corals and Sponges of Early Seas

By CARROLL LANE FENTON

IN AN Indian grave near Racine, Wisconsin, excavators found an oddly-marked stone. Though not shaped for any use, it must have been precious to the early chief with whose spears and arrows it was buried.

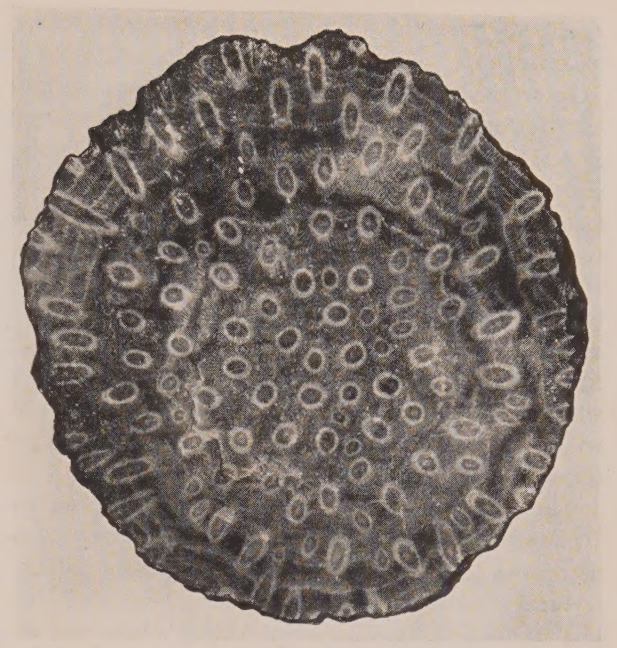
That stone was a fossil coral mass that lived in a late Devonian sea three hundred million years ago. It was the home of clustered, translucent polyps whose bases built it up in lacy details that were revealed when the fossil was polished. Though discovered in a Wisconsin mound, both its species and its preservation show that this coral originally came from a hillside in northern Iowa. By how many captures and trades did it reach the tribe hundreds of miles farther east?

That Iowa hillside is rich in corals of a long-vanished sea. There also are banks of fossil sponges and countless thousands of early shells. Farmers turn corals up with their plows; sponge banks are blasted, crushed into bits and burned to form the Portland cement from which buildings and pavements are made. Roads built from fossils often cross streams whose beds are filled with corals, sponges and shells weathered from nearby beds of stone.

The richest fossil beds are shales that weather into yellowish clay. There the Indian's coral is found, along with many that are shaped like horns. Each horn matches a single pit on the specimen from the old chief's grave; at its top we find a deep, ribbed cup in which the delicate polyp sat with its tentacles stretched forth in search of food. But the moment a primitive shark swam near, each polyp closed its gaping, round mouth and folded its body into a ball that hid its tentacles from harm.

On the sides of the "horns" many animals lived, just as they live on corals today. There were worms with tubes like tiny snails, from which red plumes appeared when nothing was near to cause alarm. Delicate structures that looked like moss were the homes of branching bryozoans —creatures whose closest cousins were shells living on the mud near by. Indeed, some shells came closer than that, cementing themselves to the coral masses among their tiny relatives. Corals, in turn, grew upon shells: for they had to have a solid base on which to begin their curving horns. How they managed to keep upright, even then, is a problem no one has solved.

Not far away, sponge colonies grew—some red, some yellow, some purplish or brown. Their surfaces bristled with tiny spicules or spines; star-like canals led to the pores from which waste foods were thrown. The mouths were still smaller pores scattered among the spines, so



AN ANCIENT CORAL HOME

This colony of corals was found in the grave mound of an Indian chief. The polished section shows details not observable on the surface

PROOF THAT AN ANCIENT SEA ONCE COVERED THE STATE OF IOWA

The upper beds of limestone near this Iowa creek were built by sponges of a Devonian sea. Layers of shale between the ledges contain many fossil shells

small they cannot be seen even when sought with a microscope.

Below the buff, coral-bearing shales are blue clays now used for brick and tile. Today, that clay is dug by machines, which pay no attention to precious fossils. Twelve years ago, it was blasted out and piled into cars by workmen who also knew little of fossils—yet who kept watch for unusual things and gave them to visiting collectors.

One day, as I walked up to the clay pit the boss called to me from his office door. "Say, I got you some things that look like great, big petrified bolts. They must weigh fifteen or twenty pounds, so nobody carried 'em away when I said one of you rock hunters might want 'em. If you're man enough, load up your sack and help me get this office floor clean."

The "petrified bolts" were fossil sponges, whose framework once resembled glass. Such glass sponges live near Japan today; in the ages past, millions on millions of them grew in sandy bays of western New York. Yet they are rare in the Mississippi Valley, whose seas advanced and ebbed at the same time as those in the East.

Stranger, perhaps, yet by no means so rare, are the sponges that built the beds of stone from which Portland cement is made. Some of them reached enormous size: colonies three to ten feet in width are not at all hard to find. Often they were packed so closely that the rocks are merely layers of sponge; at other times they were scattered about, letting mud collect and a few corals grow. Sometimes a few snails wandered in, crawling about in search of food or finding shelter in shallow holes. That they didn't eat the sponges seems clear; probably strong flavor and countless small spines warned them away.

Most surprising of all, to some, is the surface on which these sponge banks grew. A layer of worn, channeled stone, it once was the surface of a land from which sleepy rivers flowed. Sinking, it vanished beneath the sea, whose waves carried away the soil and left the rock beneath lying bare. There the sponges found a chance to grow, on a bottom that would not slip or sink, or clog their delicate pores with mud. Growing, they built their layers of lime and buried a vanished, "fossil" land beneath their petrified skeletons.

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NEW SHRUBS for BANK PLANTINGS

By VICTOR H. RIES

FOR MANY years the rockspray shrub, *Cotoneaster horizontalis,* has been used widely whenever a low-growing trailing shrub was desired. For places where it winterkills, the following hardy substitutes are now available at many nurseries.

Cotoneaster adpressa is a delightful semi-trailing shrub reaching a height of a foot or so while trailing over the surface, the branches rooting as they grow. Its tiny leaves, not more than one-fourth inch long, with their crinkly margins and its masses of red berries, appeal to all who see the plant.

Similar but slightly larger in every way is *Cotoneaster apiculata,* growing two feet or so in height, with leaves slightly less than one-half inch long. Like so many other cotoneasters, its horizontal growth follows the contours of the ground where it is planted. The glossy green leaves give a rich luxurious appearance to the entire plant.

Even rarer, although available from a few nurseries, especially those specializing in rock plants, is *Cotoneaster dammeri radicans,* introduced from China in the early 1900's. It is easily distinguished from practically all other cotoneasters by its completely prostrate or crawling habit of growth. The long spreading branches grow absolutely flat on the ground, rooting as they grow. The leaves are

THE NOT-SO-HARDY ROCKSPRAY SHRUB
This low-growing plant has been found to winterkill in more northern latitudes and is being replaced with the hardier varieties discussed in this article

evergreen or nearly so, depending on the severity of the winter. The hardiness of this form, although not as extensively tested as the other two, seems about the same.

Since you may be able to purchase these new shrubs only as small plants in three- or four-inch pots, they are best planted in the spring or early summer to allow them to become established before fall. Like all cotoneasters, they should be left undisturbed once they are planted unless moved with a ball of earth around the roots.

Plants with a Poison Touch

"Leaves three, turn and flee" is an old adage that should keep everyone from contracting ivy poisoning, but what about other plants that are capable of producing similar results?

By DONALD C. PEATTIE

THERE have been warnings without number against the dangers of poison-ivy, but not many people know the several other plants, not looking in the least like poison-ivy, that contain similar volatile acids and produce the same wicked symptoms. To poison-ivy is often laid the blame for many cases which are really the fault of the juices of the poison-sumac, poison-oak, and the poison tree.

Recently I paid a visit to a friend, and found him disfigured by ulcers of the mouth, hands, throat and nostrils—a painful sight. And yet he knew poison-ivy well and swore he had never touched the weed. His story was this: he is an inveterate smoker and pipe fancier. Thinking to make himself a new pipe he went out on an alder bog and cut himself a twig of a handsome tree with soft pith. Then he lit up. And his troubles began. For he did not know the glossy-leaved poison-sumac plant when he saw it.

PHOTOGRAPH BY U. S. DEPARTMENT OF AGRICULTURE

POISON-SUMAC OF THE SWAMPS

In general appearance it is much like any other sumac, but it has glossy leaves, and white berries instead of red

In lighter vein, there is a joke on myself. When first I commenced plant studies in my college days I botanized in a bog in northern Indiana. A straggling shrub with glossy leaves attracted my attention and I collected several specimens in the hope of adding to my store of wisdom. In this I succeeded far better than I had imagined. Scarcely had I identified my find, to my horror, than I was afflicted with an itching palm. Never have I known *Rhus* poisoning to take effect more quickly, nor persist longer. What my friends had to say about an aspiring botanist who could not stay away from poison plants did not add to my comfort. There was a maid of some seventeen summers who laughed more scornfully than all the rest. As she is now my wife the story has not died as young as I might have hoped. The skeleton in my professional closet rattles its bones to this day.

The resemblance of poison-sumac berries to mistletoe has led to several rather dangerous errors. In the Center Market at Washington, D. C. one Christmas, several wreaths with poison sumac were found by Dr. Edgar T. Wherry, and the newspapers carried accounts of similar occurrences in other cities. Not infrequently foreigners on Cape Cod have contracted sumac poisoning by gathering the berries at Yule-tide.

Poison-oak is a term often applied to poison-ivy, but it should be reserved for species of *Rhus,* mostly of the south, in which the leaves are, to be sure, trifoliate, but are so lobed that each leaflet looks like an oak-leaf. Thus does the malicious plant disguise itself. By their fruits ye shall know them. As ever, the berries are waxy white.

When you go to the tropics, or even to southern Florida, you will meet with a gigantic forester called poison tree, *Metopium toxiferum.* There are many myths about the deadliness of the tropics, but the poison tree is a reality. It abounds around Miami as a shrub in the hammocks, and in that earthly paradise called Royal Palm Hammock or Paradise Key, it is the one fallen angel. Here it is a great tree, its smooth, fat and glossy bole fairly inviting an admiring pat of the palm. Beware its seductions. Its leaves are shiny and trifoliate, and its bark is a lurid orange color.

A little-known but common and dangerous contact-poison is manchineel, *Hippomane mancinella,* one of the poinsettia family, which grows in dense thickets on many beaches of tropical Florida. It has a leathery rounded leaf and black berries, and contains an intensely poisonous milky juice that spurts out of the brittle stems when they are broken by a touch of the hand.

Even poison-ivy is not always easy to distinguish. In the New England states, for instance, it is a tree-climbing vine or a shrub straggling over stone walls. But visit the middle-west and in many places the vine is not to be seen. Beware of a low-growing, strictly erect, tri-

foliate shrub, however. Though it never climbs, even when it could do so, it is still poison ivy. Its roots spread great distances underground, making its eradication difficult. As a child playing in the sands of Lake Michigan my hand often brushed a root while digging and brought on dermatitis.

The poison-ivys of California, of the Rocky Mountains, of the northeastern and southeastern states represent four or more distinct species. But they are all fairly similar and easy to tell in season. But when the leaves have fallen they are, perhaps, a greater menace, because it is so easy to touch the plants without knowing it.

In its winter aspect, a poison-ivy vine looks like an evil centipede, with its thousands of yellowish rootlets and the suckers attached to them. The Virginia creeper also has aerial rootlets and suckers, but they are blackish or grayish, much fewer, and rather thicker and twisted. Poison-ivy is, no matter what anyone tells you, active in winter.

This was demonstrated by the sad adventure of a young boy of my acquaintance who set out to gather Christmas decorations. He scaled a black gum tree in search of mistletoe. On his way up he pulled on a helpful vine which, like himself, was engaged in climbing the black gum. Whoever he intended to kiss under the mistletoe must have grown suddenly shy when she beheld his disfigured hands and face.

The stiff stem hairs of the primrose and the showy lady's slipper are accredited with producing a rash if touched. Such cases, however, must be rare. The sores are said to be rather like those produced by nettles. Nettles, too, are contact-poisons, but their effect, however painful, is brief and does not spread over the skin. The wood nettle, when you know it intimately, is not likely to be forgotten. Similar in their action are the cruel little jatrophas or "tread-lightlies" of the Florida sea beaches. Their long silver hairs often break off in the feet of the bathers and discharge their acids in the blood.

Then there are the poison varnish trees of Japan and China. Some have been experimentally tried in this country, with, however, gratifying mediocrity of success. The exquisite lacquer box on your dressing table, and the great lacquered bridge of Japan, have been created at the cost of terrible human suffering. For lacquer is produced by the hardening of the juice of an oriental species of *Rhus* with poisonous sap. No doubt our own poisonous species might be used for lacquer. But it takes the humble patience of the Oriental workman to experiment with and work in this menacing medium. They say the first ten years are the hardest—those years during which the artisans in lacquer suffer torment from ulcers. After that, the workers acquire immunity or go to their fathers in Nirvana.

Now after these dire warnings and alarms, it might seem well to suggest a panacea for ivy poisoning. But alas, there is no cure that will work for everyone. I once witnessed a miraculous cure of a girl badly poisoned by ivy. The next week I went to the same doctor with a case of poison sumac. He gave me a salve, which, by some homeopathic principle like getting a hair from the dog that bit you, was made of stinging nettles. The more I applied it the worse I became. The only satisfaction I got was when the much-nettled physician gave up the case and sent me to a skin specialist.

PHOTOGRAPH BY C. R. SHOEMAKER

A MALICIOUS PLANT IN DISGUISE

The poison "oak", although bearing tri-foliate leaves as does the poison ivy, has leaves that somewhat resemble those of an oak. The waxy white berries betray the plant

My advice, both as a botanist and a sufferer from *Rhus* poisoning is this—don't get poisoned. Learn to know poison-ivy by its winter condition, by its colors in autumn, its flowers and fruits in summer, its leaves in spring. Learn to know its even more vicious allies, poison sumac, poison oak, the poison tree. If you have to garden in poison ivy plots or if you happen to be a queer duck of a botanist, wear gloves, and watch your face when you stoop down, "nor suffer thy pale forehead to be kissed" (by any poisonous plant), as Keats advised.

If you do get poisoned—and if you are not immune, you are certain to, some time, unless you live on a salt marsh or an alpine summit—do not trifle with home-made remedies like washing in this or that, but go to a physician at once. And change doctors until you are cured.

Every day, in certain ways, we are getting better and better!

By STEPHEN HAWEIS

Illustrated by Russell O. Berg

THE LIGHT HE SHUNS

IT SEEMS a very real satisfaction to those well stricken in years to hark back to the good old days when things were so much better than they are today, but those whom the gods love die young—no matter what age they happen to be at the time. For the young are those who can perceive that it is not without reason that things change; who know that the real Golden Age was not at the beginning, and may be at the end. If the ancient ways seem better it is because—fortunately for sanity—pleasures are more easily remembered than pains. During periods of transition, like our own, confusion makes the old and idle long for the peace that they began to remember when the pains stopped.

If there is one thing in which the change for the better is most obvious it is in the relations between man and the animals. It was in the beginning of the world that the hunter was paramount—one degree removed from the beast—but he killed, like a respectable beast, for necessity, and because his intelligence had not yet developed to the point where agriculture provided him with food. Thereafter he fought for his right to eat what he had planted against animals that had not come to understand the sanctity of private property. The domestication of animals was another step, and if he treated them cruelly it was because his own struggle for life was cruelly hard and he saw his beasts of burden only as means to an end. Two thousand years ago the animal was for use alone. Two hundred years ago nobody doubted that the screams and antics of tortured animals were a legitimate source of amusement. We have made progress; certain forms of cruelty are no longer regarded as legitimate at all. Let anyone attempt to beat a dog, or roast a living cat in public, and the progress will at once become noticeable to the meanest intelligence. Manners, customs and conditions pass away, the good with the bad, as we do ourselves, but it is not without reason.

Our sense of humor is not dead because it changes. The jokes of our forefathers seldom amuse us very much. The humor of Artemus Ward perished before W. S. Gilbert and Peter Dunne, but the Bab Ballads and Mr. Dooley hardly awaken a smile in the eyes of youth today. It is not true that our fundamental instincts are unchangeable; the caveman may not be extinct, but most of him are in jail, or headed in that direction.

The famous hunting instinct is not an ancient thing, and it is already slated for fetters. Killing for pleasure grew, like a fungus, out of the fight for life, and persists today largely among people who find pleasure and excitement in pursuit and have not quite enough mentality to appreciate what are the real causes of that excitement. The hunting instinct is not a genuine antique. Human beings do not yearn for blood-spilling. Only the lowest types derive any gratification from killing large numbers of creatures when neither skill nor courage is required. Men murdered docile seals and penguins because it was a novelty, but they soon tired of it, as they tire of killing large numbers of rats or any other vermin. It soon becomes merely disagreeable work.

It is not the hunting instinct that caused the destruction of the passenger pigeon but chiefly the desire to sell their bodies—which is quite another motive. The man who will cheerfully murder any number of wild ducks usually does not want to kill an equal number of tame ones; he will take infinite trouble to find and kill a rare sheep when he could easily slaughter a great number of common ones. Even good fish, when too abundant, present little temptation to the sportsman; you cannot take pleasure in pulling fish out of the water when they will eat anything you offer them. The game-hog has his limits.

Quantity killing of anything reaches a saturation point when the hunter ceases to want to hunt any more; it is noticeable that the more intelligent the man, the sooner he loses interest in slaughter. The proof that the instinct can be changed is that it does change. The true sportsman begins by demanding the element of chance, to which he soon adds the chance of some danger to himself. The quarry must be strong and intelligent to give him a sense of triumph when rabbit-shooting ceases to provide any sort of thrill. Man, himself, of course, is the best of game animals and was formerly hunted on all possible occasions.

We have made progress. Our finest game animal is now so highly protected that only the lowest of men venture to break the taboo—without a license and a uniform from the Government. War is still respected, but the most valuable work of the world is done without flags and band music.

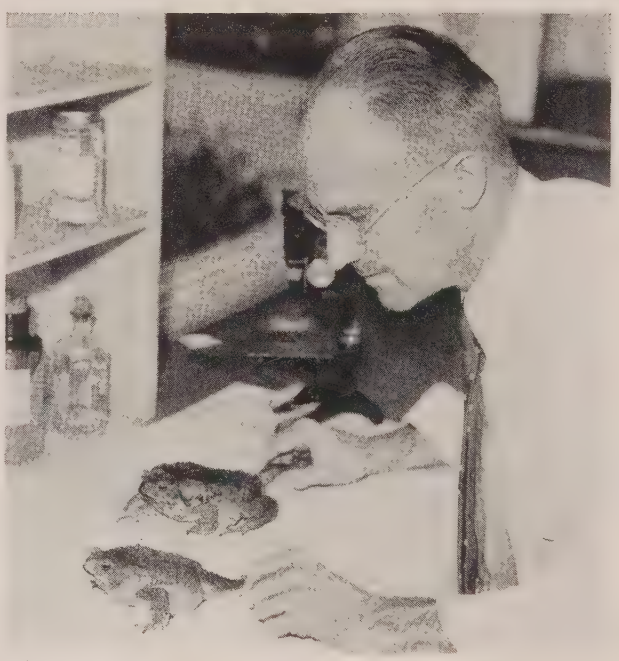
Higher-grade-man refines his fishing tackle to a hair and reduces the bore of his gun; he limits his bag without waiting for the law, which is made for his inferiors. The more inferior the man, the more he kills, and the less he knows about what he is killing. One wonders sometimes whether it might not be better that those who take the gun should perish by the gun—oftener!

No doubt great numbers of people still derive pleasure from modern sport that they can obtain in no other way—that they know of. The low-grade man cannot be appealed to through his intelligence. For him, "Thou shalt not kill!" was written. Those of finer intelligence can be reached by reason. They already limit their bag to a real minimum and create their own difficulties to increase their interest; they may even be weaned to the use of the camera gun, but the greatest hope lies in their learning something about the lives of the creatures they go forth to slay. The man who knows his wildlife soon begins to take more interest in the life than in the death of his game. When this leaven comes, it is safe in his hands.

Toads in the Sugar Cane

By WILLIAM ATHERTON DUPUY

BUFO MARINUS is one of the largest toads in the world. It is a native of middle America, but acquired the name of Puerto Rican toad by demonstrating its usefulness to man on that island. It has a ravenous appetite and its gormandizing proclivities have been harnessed and their money value demonstrated. The toads have been shown to be valuable cane field workers because of their ability to devour great numbers of insects that otherwise would damage the crop.



YOUNG WORKERS FOR THE HAWAIIAN CANE FIELDS
Entomologist Pemberton inspects two immature specimens of *Bufo marinus* being bred for usefulness to man

During the present year more than a million of these young toads have been bred at the Experiment Station in Honolulu and distributed to people, mostly growers of sugar cane, who would benefit through their insect voracity. Clumsy as it seems, toads have an effective method of their own, the swift thrust of the tongue, of capturing elusive insects, which seems to work quite as well as a man-devised fly swatter. An army of them sit today in Hawaiian cane rows and eat industriously in the interest of sugar for the breakfast coffee.

The toad hatchery for the production of this new article of commerce is in Honolulu, and its output, when the individuals have acquired the proper age, is distributed in tin cans to the plantations. The full-grown *Bufo marinus* is more than six inches long, and almost as wide. It is thought by many to be the most intelligent of all the members of the toad family. The million of these toads that now live in Hawaii all descended from 148 originally imported by C. E. Pemberton, Hawaiian sugar entomologist, from Puerto Rico in a suitcase and by airplane.

Bufo marinus has a voice like a steam riveter. If the million of him in Hawaii should vocalize simultaneously of an evening it is conceivable that conversations on residential "lanais" (this being Polynesian for balconies) might be materially disturbed. But these gentlemen of science who devote themselves to a study of the lowly orders have discovered a secret of serenade procedure and upon that finding have based a technique for quieting the clamor. They have found that only the male is vocal and that he sings only under one special set of circumstances. Before entering upon such a venture, he must be comfortably at rest with his hind legs in the water because that is where he breeds. In Puerto Rico, where there are more *Bufo* males than human inhabitants, despite density of population, the voice of the toad is never heard within rifle shot of a dwelling. This is because the man creature puts a net wire fence around the nearby pools, excluding the toad from the environment that prompts him to use his vocal chords.

Planting Nooks and Corners

Solving the problem of what to plant in those out of the way places of your garden

By VICTOR H. RIES

AN UNSIGHTLY SPOT MADE BEAUTIFUL

This space between walk and steep bank has been attractively planted with Mugo pine and *Daphne cneorum.* The *Forsythia suspensa* in the background drapes down over the slope

LIVES there a home owner or a gardener who can honestly say—"Every inch of my ground is completely planted, there is not a bare, ugly or forgotten nook or corner that needs attention"? If any such gardener lived, half the fun of gardening would be gone, for there is a tremendous fascination in conquering some especially difficult spot, be it by the front steps, by the cellar entrance or back of the garage. But each one of these problems can be solved if we can only find the right plant to use for that particular place. Sometimes they are common, every-day plants, sometimes rather rare ones, and occasionally just plain weeds. For instance, take the case of a friend who had a dry, stony bank along his drive—a tough place at best—where everything he tried failed. Finally he accepted advice, visited a nearby railroad embankment, and brought home two weeds: bouncing bet and horsetails. They alone, out of several dozen different kinds, were able to survive and even to spread.

Possibly we can best see how different gardeners have solved their problem by looking over some of these nooks and corners and seeing what will grow under those particular conditions.

We should not forget, however, in planting most of these nooks and corners, that they are problem spots where even the best of plants cannot survive, much less thrive, unless we give them really congenial soil surroundings. So if the soil be poor either from the standpoint of lack of fertility or from the standpoint of being clay, sand, gravel or even brickbats, it will pay us to remedy it by replacing it with a good soil; or, if it is merely lacking in fertility, by applying a complete fertilizer such as barnyard manure, or a complete chemical one such as we may purchase mixed ready to apply.

In addition to this, a mulch of peat moss, rotten leaves, or similar material applied during the summer months for moisture conservation will give large dividends in increased growth and vigor of the plants.

Remember also that cellar foundations, tree and shrub roots all tend to make the soil drier than normal during dry seasons, and that the addition of extra water is always helpful at such times.

The narrow space of a foot or so between the house foundation and a sidewalk is difficult at best, for most things will crowd out over the sidewalk. For sun or shade try the winter creeper, *Euonymus radicans.* It will cling to the wall and crawl over the ground. For shade, you may also plant plantain lily, columbine, *Pulmonaria, Teucrium,* or Hicks yew. For sun, try

NARROW STRIP PLANTINGS

Euonymus radicans acutus covers the wall, and *Teucrium chamaedrys* fills the space between it and the walk

Hicks yew, hardy candytuft, or if two feet are available, Lemoine mock-orange and yucca.

The bare ground between newly planted evergreens may be covered with periwinkle, Japanese spurge, English ivy, moss pink, hardy candytuft, *Sedum album, Sedum ellacombianum, Dicentra eximia,* or *Epimedium,* among many other low growing perennials.

Beneath old leggy shrubs, shaded and often dry, the *Ajuga* or bugle is ideal. The periwinkle, *Euonymus coloratus, Euonymus obovatus,* lily-of-the-valley, and *Sedum ternatum* may be used.

Cistern tops are difficult at best unless hidden by *Forsythia suspensa, Rosa wichuraiana, Euonymus coloratus,* English ivy, or a mass of vine such as Japanese bittersweet.

The narrow strip between the drive and the boundary line, seldom over two feet wide, is usually a problem. Narrow growing shrubs for such a place are Lemoine mock-orange, rose of Sharon, and pussy willow. Erect growing perennials are gas plant, *Aster tataricus, Heliopsis scabra,* phlox, lilies, *Cassia, Thermopsis* and Joe-Pye weed.

The nook that the paper boy cuts through can be plugged by using the five-leaf aralia, Japanese barberry, fire-thorn, or if its planting is permissible, the purple-leaf common barberry.

The corner between the house and front steps is often a problem. Instead of the customary pyramidal evergreen, try a rounded one. If boxwood is not hardy, use the inkberry, *Ilex glabra,* a sheared plant of fire-thorn, or *Euonymus carrieri.* If shrubs are desired in place of evergreens, try the alpine currant or the Regel privet.

The angles and corners of the front walk steps may need softening. Here we may use one of the trailing junipers such as the Sargent juniper, the Andorra juniper or the Waukegan juniper. Another fine plant would be the evergreen bittersweet, *Euonymus vegetus,* or the wintercreeper, *Euonymus radicans.*

Tree trunks may be softened by a climbing vine—for evergreen effect the English ivy, if hardy, or the wintercreeper may be used. The geranium creeper, *Ampelopsis lowii,* is a delightful little vine. For large trees, if we will keep it within bounds, we may use the clinging form of the woodbine.

Stone steps can be softened in their effect by planting small rock plants in their cracks and corners. Hen-and-chickens, *Arenaria verna, Potentilla verna nana, Herniaria glabra, Sedum dasyphyllum,* will all stay in their place.

The nooks at the base of trees may be brightened with a few bulbs, as crocus, grape hyacinth or daffodils, or a few rock plants such as dwarf bleeding heart, *Nepeta mussini, Pulmonaria,* sweet woodruff and others.

The space around an outside cellar entrance always needs a little dressing up. Here we may use, in sun or shade, the shrub *Kerria japonica,* or the wintercreeper again. The new Chenault coral-berry would work equally well.

That shady place beneath the maple by the back porch can be paved with brick or stone and for shrubs we can use the Japanese yew, the fire-thorn and evergreen bittersweet.

FOR THE FRONT ENTRANCE

This corner was softened by planting *Euonymus radicans coloratus,* held in place with wood strips until its own shade enabled it to cling to the wall

For ground cover try the same things suggested for beneath old shrubs. And what a lovely place we will have.

That low wet spot where water always stands after rain, where everything seems to die, is just the place for some flowers such as bergamot, Joe-Pye weed, cardinal flower, sneeze weed, *Helenium autumnale,* swamp milkweed, Japanese iris, turtle-head, and false dragon-head. They thrive under these conditions.

That big bare, back corner of the house needs a little planting to soften the effect. The Maack bush honeysuckle, the common mock-orange, European privet or Tatarian honeysuckle will be just right since there is plenty of room for them to grow both sideways as well as upward.

The ugly concrete edge of the pool can be hidden by a few trailing plants such as the grass pink, dwarf bleeding heart, snow-in-summer, sweet woodruff, dwarf baby's-breath, hardy candytuft, and moss pink. The drooping leaves of lemon daylily and columbine will also help cover it.

The bare spot in between those dwarf spireas can be brightened up with a few lilies, as the tiger lily, Hanson lily, Henry lily, regal lily and turks-cap lily.

Shady corners and angles of the house may serve as a good place for ferns and wild flowers if we will give them a background of shrubs and work plenty of rotted leaves into the soil. Shrubs appropriate and suited to such a corner would be spice bush or *Benzoin,* witch-hazel, arrowwood, bladdernut, redbud, flowering dogwood, black haw and nannyberry.

Concrete steps with side walls that are too conspicuous may be materially softened in appearance by allowing some evergreen vines to (Continued on page 375)

"LET'S PICK UP AND GO"

Outdoor America presents many inspiring and beautiful scenes, nowhere better than in certain areas that have been set aside as National Parks. Here Little Chief Mountain stands guard over St. Mary Lake, Glacier National Park. Photograph by Hileman; courtesy the Great Northern Railway.

This beautiful view of Island Lake, 9500 feet above sea level, is typical of the scenery along the new Red Lodge Highway to Yellowstone Park. Such pictures assume a new grandeur when taken by the infra-red process. Sharp detail is obtained, but the vivid greens of sun-lit conifers are rendered white. More realistic is this view of the majestic Grand Canyon and Great Falls of Yellowstone River, considered by many to be the most beautiful sight in that Park. Photographs courtesy Northern Pacific Railway and copyright by Byerly.

In any group of pictures of our parks there should be at least one of the Grand Canyon of the Colorado, Nature's greatest example of her erosive powers. So here we present two for our magazine sightseer, taken respectively from the north and south rims of the great gorge, and reproduced by courtesy of the Union Pacific and the Atchison, Topeka and Santa Fe Railways.

Pictured below is the view from the summit of the Red Lodge Highway to Yellowstone, at 10,940 feet. The rugged peaks of the Beartooth range rise in the distance. Only a few years ago the entire region north of Yellowstone Park was inaccessible except by arduous journeys by pack train over difficult trails. Photograph by Byerly, courtesy of the Northern Pacific Railway.

From Miss Florence Anne Sumner of Elk Grove, California, come the two interesting photographs of Half Dome, in Yosemite Valley. The first was taken in April, 1935, and the second in March, 1936. The remarkable thing is not that the mountain, except for the mantle of snow, looks the same, or that the creek, which happened to be in flood when the second picture was taken, has inundated the small peninsula in the center, but that the twigs of the tree in the upper center, in spite of a year of wind, rain and snow, are identical in form. And now, if our readers will refer to page 239 of the October, 1928 issue, they will find another picture of Half Dome, with the same twigs as they appeared nearly ten years ago—in exactly the same position!

Pictured at the bottom of the page is Fortress Mountain, Jasper National Park, Alberta, Canada, with a group of tourists, led by a park guide, fording the Chaha River at its base. Courtesy Canadian National Railways.

Mount Moran, 12,594 feet in altitude, one of the northernmost of the Teton Range, and only a few hundred feet lower than the Grand Teton, is here shown ten miles away across the full width of Jackson Lake. The Tetons rise protectively above Jackson Hole, first traversed by white men of the parties of Coulter and the Astorians; once a rendezvous of western badmen; now a sightseer's paradise.

Majestic in its supremacy, as befits the great mass styled by the Indians "The Mountain that was God," is Mount Rainier, in the state of Washington. Up-bearing on its summit the greatest ice mass in the United States, and on its sides wild gardens that are unsurpassed in loveliness the world over, Mount Rainier impresses the visitor as preeminent in its beauty and majesty. The curving ribbon of ice in the valley is massive Emmons Glacier, one of our largest. This view, looking southwestward toward the summit from near Sunrise Lodge, was taken by Robert Dauphin, and is reproduced by courtesy of the Northern Pacific.

New breath-taking scenes appear at every turn in the Going-to-the-Sun Highway, Glacier National Park, Montana. This road, of course, takes its name from the picturesque title given by the Indians to the lofty, sky-pointing peak that is one of the Park's main attractions.

Trick Falls, near the outlet of Two Medicine Lake and the eastern border of the Park, has become well-known from its peculiar conformation. A huge crevice about a third of the way up the rock wall discharges most of the water of Two Medicine Creek, and except at times of flood stage, the higher falls are not particularly impressive. As the supply of water diminishes, in periods of scant rainfall, the higher falls grow smaller and smaller and finally cease to flow. Photographs by Hileman; courtesy the Great Northern Railway.

WILSON'S PLOVER

By IVAN R. TOMKINS

The term "shore bird" may mean any species of a widely varying group that includes the sandpipers, curlews and others. The plovers, however, may be considered more exclusively birds of the shore, and the Wilson's plover, ***Pagolla wilsonia,*** of the south Atlantic coast, particularly so.

All the plovers have large eyes and keen sight. Usually they do not probe the mud as do the sandpipers, but stand motionless until a bit of food is sighted, often at a considerable distance, and then run swiftly to the spot.

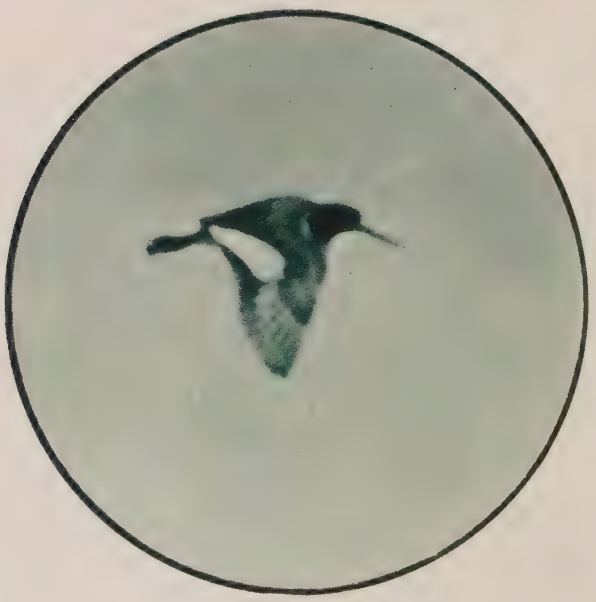
Wilson's plover nests on open sand close to salt water beaches, and often gathers small bits of shell or pebbles with which to line the simple nest cavity. The large eggs perfectly match the surroundings.

The male wears a black collar, while his mate has a lighter-colored neckband of grayish-brown. Both attend the nest before the eggs hatch, but the female alone attempts to lead suspected enemies away from the hid-

den young by pretending to be crippled. In this action the tail is depressed and spread, and the wings beat on the sand as she struggles away. If one follows, she soon springs into the air. Some bird students believe that this is not the true interpretation of the display, but it is the older and seems the most reasonable.

When the eggs hatch, the nest is occupied only a few hours, and then deserted. A tiny body set up on

stilt-like legs, and closely patterned after the egg marking on crown and back, describes well the precocious youngster. It is attended by its anxious parents until it is able to fly, and abides on the sand and among the thin grasses of the beach. Some observers believe the piping plover, ***Charadrius melodus,*** picks its own food as soon as able to run about, and is never fed by the parents. Perhaps the Wilson's plover does the same.



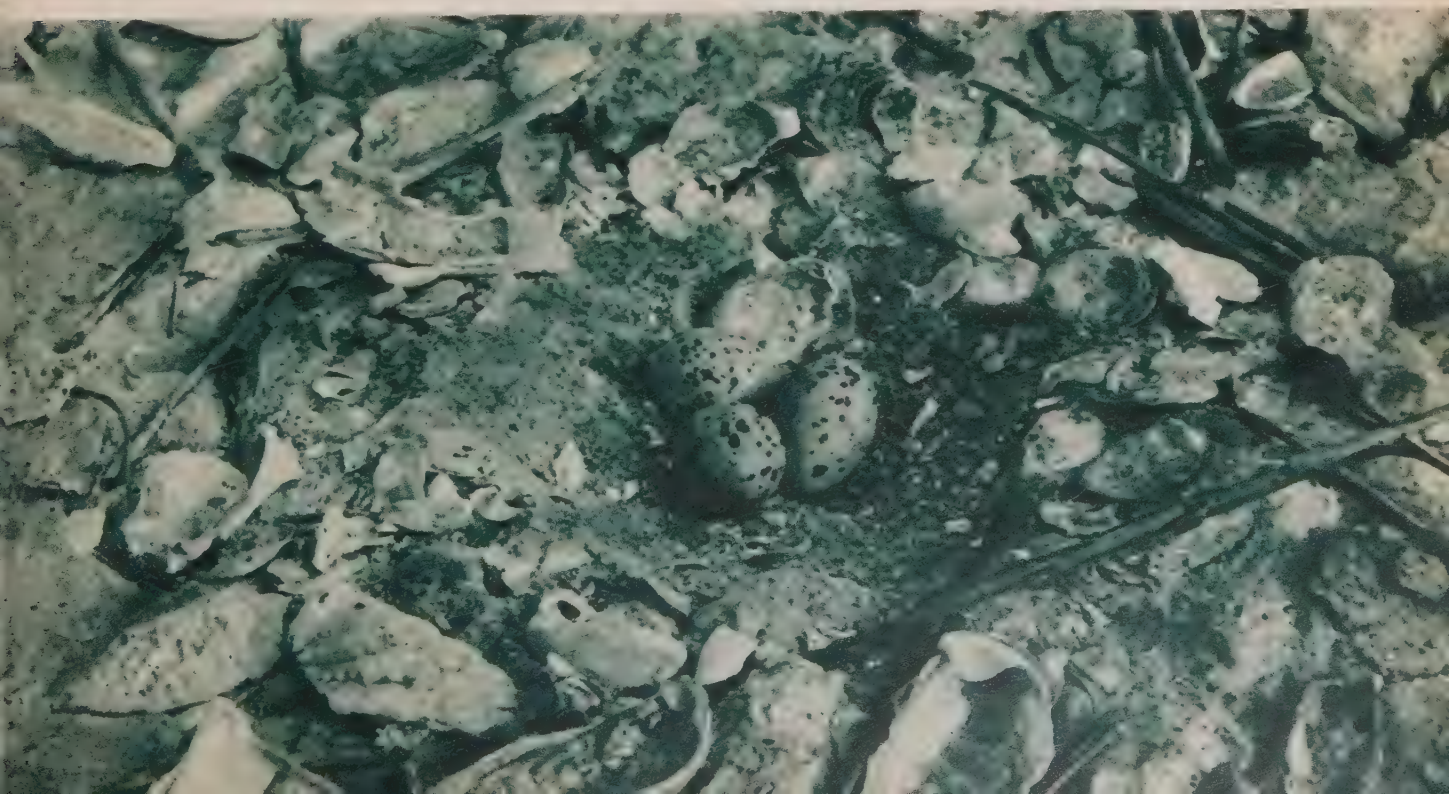
American Oyster-catcher

By IVAN R. TOMKINS

Many persons who see a picture of this bird may wonder why it is called the "oyster-catcher," but those who know it in life need never to ask this question, for it is always associated with oyster reefs. The American oyster-catcher, *Haematopus palliatus,* inhabits the coasts of our southeastern states. Two other forms, including a species that is dark nearly all over, lives on the Pacific Coast, and all are obviously oyster-catchers. All have heavy, strong, oyster-knife bills, and strongly-shod feet that enable them to walk safely on the sharp-edged beds of "coon" oysters and barnacles. The birds use their heavy bills to reach into the shells as they gape in the tide that just covers the beds. The closing muscle of the bivalve is easily tired or severed, and then the oyster is at the mercy of its special enemy.

Over much of its territory, this is a rare species, but along the coasts of the Carolinas and Georgia it has been increasing during late years, and flocks of sixty to seventy-five can be seen regularly in winter in some favored places.

The habit of making the nest close to the water's edge, within reach of heavy storm tides, may be one of the reasons for its rarity in some regions. Like most young shore birds, the young are adept at hiding, and the one pictured swam out in the surf at least two hundred yards to escape capture. It was necessary for me to wait for an hour before it returned to shore and hid in the drift sedge piled up by the tides. Although at least four weeks old, it still was being fed by the parents. It is plainly evident that the bill does not begin to develop its strength until about the time the young bird begins to fly. In the newly-hatched young, the bill is hooked at the tip of both mandibles, and through the downy stage is much like that of the willet, another shore bird.



The rapid growth of the dwarf nasturtium is shown in this series of pictures, magnified about four diameters. First we see the young nasturtium a few hours after its appearance above the ground on June 19 at 9 A.M. Then, taking the photographs in order, the same plant photographed on June 20 at 8 A.M. and 3 P.M.; on June 21 at 8 A.M., when it is erect, and the leaves are well unfolded; and at 4 P.M. of the same day, when they nearly have completed their unfolding process.

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Watching a Nasturtium Grow

By O. M. ERPENSTEIN

The gradual development of a plant from the seed to full growth is a most interesting phenomenon. In the study of plant life we may not only observe the structure of the different species, the leaves, the flowers with their intricate details, the various factors at work in pollination, but also the oftentimes rapid changes from day to day, and, in the first stages, even from hour to hour, in the growth and development of the plant.

The observation of processes of growth of a plant becomes more interesting if a photographic record is kept. The series of photographs shown here are of the dwarf nasturtium, *Tropaeolum minus*. The plants illustrated were grown, for experimental purposes, in those tiny flower pots provided by florists for cactuses. It was quite obvious that the pot would not be large enough to permit the plant to attain full growth. It never did reach that stage, for this reason. However, the development from the first outcropping of the plant above the ground, and the subsequent rapid changes during its early life, are well shown in the pictures herewith.

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The progress of the growth of the nasturtium now is not so rapid that it could be noted by hours. These two pictures were taken on June 24 and 27 respectively, and the second shows the development of a third leaf that appeared during the interval.

These pictures were taken July 4, 10, 15 and August 1. In the third picture the plant has reached its climax under the conditions of its artificial environment. The leaf on the left is dropping and the one at the right is beginning to show evidences of discoloration. Before the leaves finally dry up, they turn yellow—the first indication of the withering process. The last photograph taken of the plant shows that the withering of the leaves was more rapid than the growth of new ones.

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The change in form was quite rapid as can be seen by the photographs. The tendency is for two leaves to form first, but thereafter only one leaf appears at a time. The beginning of the third leaf may be seen at the bottom of the first page. Soon the fourth leaf appeared, and the first consequences of the flower pot being too small resulted, as some of the leaves began to wither, and, although others continued to grow, by the first of August, a little over a month after it first appeared above ground, the plant was no longer the clean-cut, beautiful object it was during the earlier stages. Thereafter the old leaves withered faster than the new ones grew, and the plant never flowered.

The plant from another seed was examined when the shoot first appeared above the ground, and is shown in our last two pictures. The outer shell surrounding the cotyledons is still intact. The roots are rather long and most of them were broken when the plant was removed. The whole appearance of the plant at this stage suggests some queer form of spider. The food stored in the cotyledons is used up slowly, as seems probable from the size of the roots.

In order to keep a photographic record of the development of plants, a camera is necessary that will take close views of the subject. In obtaining the photographs shown the writer used a 5 x 7 view camera, and the plants were photographed by the lights ordinarily used for copying. If the Nature lover is equipped properly there is no end of enjoyment in keeping a record of plants as they develop. Such a record has the additional advantage that it may be studied at any time thereafter for comparison with other photographic experiments.

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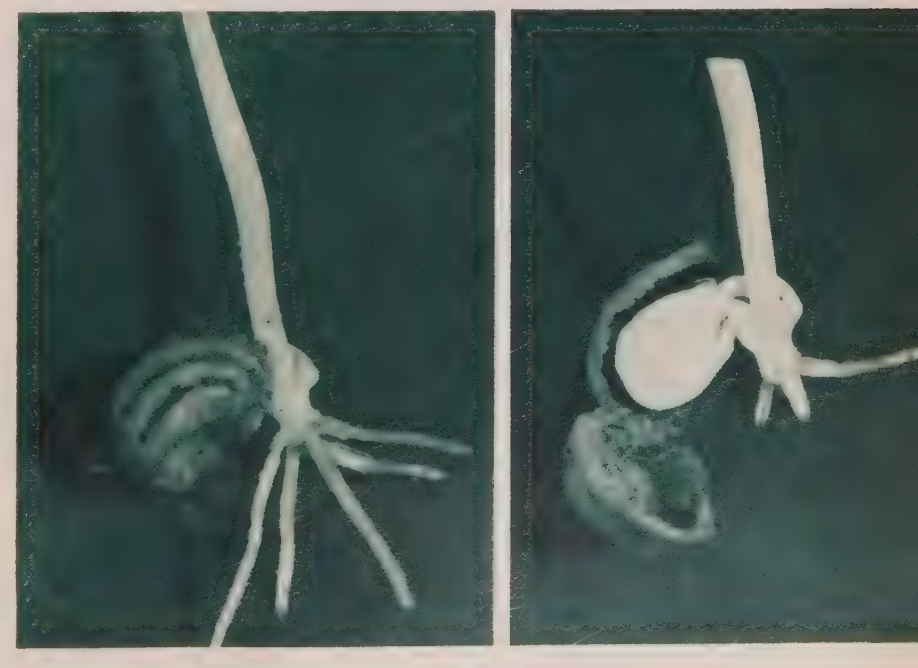
Here pictured, several times enlarged, is a dwarf nasturtium removed from the soil after the plant began to appear above the ground. It resembles some strange sort of spider. The roots are much longer than the size of the cotyledons would warrant.

Here the seed is opened, exposing the cotyledons, which are protected by a thick and fibrous shell that probably persists until they are used up.



Whenever we were in the yard, the mother western flycatcher would stop for a moment on the garden faucet before flying to her nest on the porch.

Although this Alaska hermit thrush was always on the alert, he displayed no fear even when we sat within a few feet of his favorite drinking place.

The Alaska hermit thrushes were anything but hermits. In our tiny sanctuary one October day nine were in the yard at one time.

Birds of a California Garden

By H. D. WHEELER

In the foothills of the Coast Range north of San Francisco Bay lies an area particularly favorable for bird life. This section provides nesting sites for some birds that make their winter homes in the southland, and a friendly shelter in winter for others that summer in the high mountains and the colder country to the northward. During the spring and autumn seasons many others stop for briefer visits while on their long migrations.

At our home on Howell Mountain we try to make the birds welcome. The flowers in the garden invite the hummingbirds, the insects intrigue the flycatchers, and the feeding places sometimes hold the attention of the juncos and the slender-billed nuthatches. But the thing that bewitches them all is the abundance of water in the yard during the dry days of summer and early fall.

By June, the little natural watering places become dry and no water is obtainable within a mile of our home. From this time, the birds have a daily water carnival in our garden. The lily pools, the little waterfalls, the bird bath, and the whirling sprinklers welcome our songster friends, and they richly repay us by providing a new pleasure and enjoyment not known before. They teach us much about their characteristics, habits, and songs, and we count them as our close friends.

The brown creeper, here pausing in his spiral quest for food, is about to drop down to the base of the tree to take his drink from the pool while hanging head downward.

The Harris woodpecker, after hitching his way down the black oak trunk to the pool, always would hunt around a bit for food before flying away.

How interesting it was one July morning to check off twenty-three varieties and more than a hundred individuals within two hours' observation. We were surprised, one sultry day, to see an Allen hummingbird desert the flowers and take a drink from the little hollowed stone we had brought from above Glacier Point. A brown creeper came frequently to drink, but apparently never to bathe. Then one day he discovered water running from the hose, plunged in where the force was greatest, and took a bath that might have reminded him of a wild mountain stream far away. But the greatest surprise of all was when, late one evening, we turned the flashlight toward the pool and discovered a screech owl calmly enjoying the bird bath.

"Quink! Quink!" A series of these calls always precedes the arrival of a Harris woodpecker that alights on a small oak, hitches himself down to his favorite drinking place, takes his fill, hitches up the tree again, and is gone. Sometimes the northern pileated woodpecker makes known his presence by his ringing cries and whacking beak, but the elusive Alaska hermit thrush comes quietly from the canyon oak to the pool for a drink.

Could anyone who enjoys a family snapshot album resist including these friends of the garden? I could not, and so our front yard has become a photograph gallery for the birds. While we have gone afield to obtain some of our pictures, such as the mountain and valley quail, our greatest successes have come from our own front yard. We have been favored by having our friends come to us, and they have left memories we can never forget.

A friendly "quank! quank!" announced that the slender-billed nuthatch had arrived for his daily suet and water.

These young western flycatchers, taken out of their nest to be photographed, will begin their fly-hunting careers within a couple of days. The mountain quail pictured below were only a few hours out of the shell, but scrambled away at their mother's call.

The California Quail was selected as the state bird in a poll conducted by the California Audubon Society. With twenty-two contestants in the field, this lovable bird received more than half of the 150,000 votes sent in.

SOME NATIVE FLOWERING SHRUBS

By F. SEYMOUR HERSEY

Many think of flowering shrubs as wholly the product of the nurseryman. While many have been produced by the plant breeder, some others, natives of this country, have been adopted for our home grounds. There are a number of others, with beautiful blossoms and foliage, that might well be used with equal success.

Sweet pepper-bush, *Clethra alnifolia,* first on this page, is a shrub found most commonly in moist northern lowlands. Its spike of closely-clustered, small, creamy-white flowers has a delightful fragrance.

The buttonbush, *Cephalanthus occidentalis,* grows widely near ponds and streams, a low, rounded bush. The tiny buff flowers, in a spherical cluster about one inch in diameter, come in midsummer.

Meadowsweet, *Spiraea latifolia,* usually about two feet high, grows in dry pastures and along roadsides in our northern states. Its flower spikes are built up of many small pinkish-white blossoms.

Sheep laurel or lamb-kill, *Kalmia angustifolia,* the first picture on this page, is a cousin to the mountain laurel, with blossoms of similar shape and formation, but smaller. This low shrub grows a foot or two high in old fields and pastures. The flowers, coming in June, are clustered about the main stem and vary from pale to deep rose-pink. The foliage, shown here about twice natural size, is poisonous to animals.

The low sweet blueberry, *Vaccinium pennsylvanium,* is a low early-ripening plant, ornamental in fruit and foliage. This species is bushy, a foot or two high. The foliage is a lustrous green, becoming red in autumn. The white bell-like flowers come in May; the berries, light blue with a bloom ranging from magenta to dark purple, ripen in July. It ranges widely in our northeastern states and, like all the blueberries, requires acid soil. The high-bush blueberry, *V. corymbosum,* also is desirable.

Rose acacia, *Robinia hispida,* is a shrub about eight feet tall belonging to the same genus as our common locust. The clusters of pale rose-pink, pea-shaped blossoms bloom early in summer.

★ Conservation ★

A part of Nature Magazine each month is devoted to the expression of practical opinions on the vital issues affecting our use and abuse of natural resources, including wildlife, and dedicated to the purpose of assisting Americans to play a militant part in the attainment of constructive conservation aims.

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BILLBOARDS AND ★ ★ ★ BATTLEFIELDS

Forty-thousand women have enlisted in the battle to clean up the beautiful and historic countrysides of Virginia. Organized members of the Old Dominion's garden clubs have decided that blaring and dangerous billboards, hideous food stands and sign-bedecked filling stations just "don't belong." They have approached the problem practically and are listing every billboard, stand and station; cataloging its degree of offensiveness. A men's committee is also being formed, and public sentiment will be mobilized behind regulatory legislation.

It has been interesting and sad to watch the progressive uglification of the Virginia countryside—interesting because it is typical of the grossness of the highway parasites; sad because so much of real beauty and value has been cheapened or sacrificed in the process. Good highways are comparatively recent in that state, but now a splendid system exists. Rapid highway development has been as rapidly followed by the invading billboards and the mushroom roadside enterprises. This is always the case unless zoning or agreement between property owners protects the environment of the highway in advance.

Virginia, in common with other states, can follow one or more courses for improvement. One is legislation. Massachusetts has shown the way, pushing back the billboards so far from the highway as to make them virtually useless, restricting their size, banning them from curves and intersections and otherwise regulating them. A second course is to invoke highway zoning after the pattern of city zoning, restricting the billboards and highway commerce to commercial zones. An analysis of this rapidly progressing idea is to be published by the National Roadside Council and the American Nature Association.

A third weapon against these highwayside offenders is forged particularly for the use of women. There seems to be no question that the women of the country represent the major portion of its buying power. It is they who spend, or influence the spending, for the products advertised on billboards. Women, therefore, may well take a page from the book of the women of Honolulu, who also decided that billboards "didn't belong." They announced that they would not patronize any merchant or any product using the landscape for its advertising murals. And, what is more, they did not. Honolulu and its environs is today a billboardless paradise.

While it is not as easy to apply this to our larger and more diverse scene, nevertheless forty thousand Virginia women, spending their dollars for the products of advertisers who respect the landscape, can make themselves felt. And so can organized women elsewhere.

Our Virginia friends will be importuned singly and collectively by representatives of the organized billboard industry with smooth and eloquent words. Many will be thus convinced that this industry is striving to make America more beautiful by adorning the landscape with the products of the best artists; with beautiful art pictures, well-lighted with signboards so artistically latticed, framed and adorned as to be infinitely preferable to trees, grass, shrubs and pleasing vistas. The women will encounter legislators who have been similarly—or otherwise—convinced. They will meet the short-sighted opposition of some property owners, even some chambers of commerce and so-called civic clubs who should know better. But these women, with the support of men of vision, or even without it, have the means to win. They have powerful political and economic weapons to wield.

Yes, the women of Virginia can reclaim the battlefields of Virginia from the billboard and the hot dog stand. We hope they do it, not alone for the good of the state, but as an inspiration to women everywhere.

JOE KNAPP PAYS ONE DOLLAR FINE

"Joe loves to shoot," said "Ding" Darling, in the middle of an article in TODAY, November 2, 1935, entitled "The Wild Duck Racket". These words came to mind when the news came in December, 1936, that Joseph P. Knapp, with three guests, was detected by the Biological Survey with possessing more than the daily bag limit of ten waterfowl each. When the violation occurred a large quantity of corn was found in the shooting ponds, but Mr. Knapp claimed to have its permission to bait some of his grounds, and this charge was not pressed. The trial, long delayed, was held at Elizabeth City, North Carolina, on March 22, 1937, when the four defendants, through counsel, entered a plea of *nolo contendere,* and were ordered to pay a fine of one dollar each.

Although not many of our people know Mr. Knapp, few have escaped contributing to his millions, for, according to TIME, New York City, he practically owns several of our most popular magazines, as majority stockholder of Crowell Publishing Company. THIS WEEK, a Sunday newspaper magazine section read by millions of our citizens, is his.

Ding's brief paragraph contains so much history that it deserves to be quoted. Here it is: "Old Joe Knapp, the Sage of Currituck,who is one of the best wing shots and has spent more of his personal fortune on ducks than any man in the United States, finds his shooting restricted to thirty days, no baiting and no live decoys. To the treetops, men! There's a wounded lion loose in the tundra! He sends his No. 1 Ramrod, Colonel Arthur Foran, president of More Game Birds in America, to Canada to count the ducks and prove that all those who contend there is a shortage of ducks are fools; to Illinois to contest in the courts the rights of the government to restrict shooting, and to organize a revolution against all those who stand in the way of the inalienable right of every American to shoot when and how he pleases. Joe loves to shoot. Certainly if by his efforts he succeeds in breaking down the only control that exists over the taking of migratory waterfowl, the days of the ducks and the duck shooter will be numbered."

But Mr. Darling, purposely or not, left a great deal of Knapp waterfowl history out of this short story. We will supply the skeleton background for a few other items.

The versatile "Ding" is the originator, or at any rate the popularizer, of the idea that the worst enemies of wild life are the Republicans and the Democrats. He did not name, particularly, any of these, but it is safe to say that he had in mind, as one of them, Joseph P. Knapp, because in wildlife matters he has been Republican or Democrat as the exigencies of the case best fitted. By this we mean that his influence in wildlife matters seems to extend from one administration to the next. There is abundant proof, documentary and otherwise, that Knapp was a motivating power in the revamping of the Advisory Board, Migratory Bird Treaty Act, closely following the one-month waterfowl shooting season of 1931. The reasons given for the change included the statement that the Board was too representative of well-to-do hunters. But the new Board, which included Knapp, itself was certainly no less representative of them than the old one.

In 1931 Knapp and several other influential sportsmen had organized "More Game Birds in America", a Foundation. There was a long list of founders, several of whom were New Yorkers. Among these names, one of the more significant was that of Thomas H. Beck. More Game Birds has advocated refuges, long seasons, rest days, a shell tax, waterfowl censuses, breeding and sale of game—nearly all possible methods to restore waterfowl except less shooting. In fact the frank purpose of the Foundation is to furnish more shooting—*now*. It has used its political and financial power in attempts to control the conservation organizations in several states. It succeeded in "putting off the air" at least one sincere advocate of true conservation because he dared to criticize its methods. More Game Birds is still active. "Ducks Unlimited", noticed in our March issue, is its latest effort.

In 1931 and 1932 J. P. Knapp and his associates sought to gain control of the game protective functions of the Biological Survey, and almost succeeded. The exact reasons for that failure lie buried beneath the dust of officialdom. Time passed, and another opportunity came. In 1933, the time of "easy money", it was proposed to retire millions of acres of submarginal lands from agricultural use. The super-conservationists saw their opportunity—and went after it. All at once there was a President's Committee on wild life restoration, composed of three men. Its Chairman was Thomas H. Beck, Knapp's right-hand man in his colossal publishing enterprises. A second member of the Committee was Jay N. Darling, a "dangerous" conservationist in that he wielded a powerful brush, and was violently opposed to decoys and baiting, the mainstays of successful wild-fowling with a fast decreasing supply of birds. The third member was Professor Aldo Leopold, an expert ecologist and game expert. The Committee sat a few weeks in December, 1933, and January, 1934, at such times as the others found time to join Mr. Beck, and in late January, 1934, issued a mimeographed report, later printed in more complete form, that was chiefly noteworthy for what it did not say about the causes for wildlife decline. It was commonly reported, and we believe that this is true, that none of the three signed the report but Chairman Beck. If this is so, the fact is highly complimentary to Darling and Leopold. The Committee proposed to spend twenty-five millions of dollars in improving environment and creating more wildlife. It did not mention shooting. With this Committee, Joseph P. Knapp had no ostensible connection, but let no one imagine that the selection of Knapp's managing editor to head this Committee was a mere coincidence. Subsequent events point otherwise.

In the spring of 1934 Jay N. Darling was made Chief of the Biological Survey, Mr. Redington having shortly before been transferred back to the Forest Service. There

soon followed a reorganization of the Biological Survey in which game species became the outstanding concern of the Bureau. A few of the proposed millions were actually secured and are being utilized. Many refuges have been established—and shooting has continued. By the time Darling wrote in TODAY the paragraph we have quoted, he had become well acquainted with both Knapp, Beck and Foran. Not long afterwards he returned, without regrets, to private life.

How are the mighty fallen! Joe Knapp, of Currituck, is fined, with three of his guests, a dollar each for shooting between them a few more than the legal take of ducks. Forty-five ducks, in themselves, do not count for so much, but according to the current calculation of duck population, and even considering the ducks as belonging solely to those who shoot, that day's kill was far in excess of the total share of these men for the entire year.

Here the reader may ask why we have presented these details concerning a man who has been apprehended with a few ducks too many in his possession. We have done so because Mr. Knapp is representative of a type of sportsman that is conservation's most dangerous enemy. He is a successful business man, a philanthropist in the community where he lives, and a genial and friendly man. But in his methods to obtain special privileges for the indulgence of the sport he loves so well, he is willing to violate one of the first principles of good sportsmanship —the willingness to share with others—by using his wealth in ways that tend to rob even his own associates of their sport, and the people at large of their right to the enjoyment of the birds. All our natural resources are today in such a deplorable condition that no one is entitled to special privileges in any field, for any reason—financial, political or social.

HE'LL TAKE BOTH OR NEITHER

DR. PEARSON REVIEWS THE YEARS

Adventures in Bird Protection is an autobiography written by Dr. T. Gilbert Pearson, who for thirty-five years has been in the fore-front of the fight for wildlife protection. It is a human interest story closely connected with the history of the Audubon Society movement; the progress of bird protection in North America and other countries. The book is published by D. Appleton-Century at $3.50.

During the youthful days of the author the passenger pigeon drew its last breath. In American history there is no more striking example of the unchecked slaughter of birds for selfish gains, nor a more dramatic picture of the ignorance and carelessness of the American people. If the Audubon movement could only have spread its protecting wings fifty years earlier, this remarkable bird might still be a part of our outdoor life.

In devoting his life to wild bird protection, Dr. Pearson started at a time when many bird species were killed during the breeding season to supply the millinery markets with plumage. Commercialism was causing the destruction of vast numbers of our upland game birds and waterfowl. Neither state nor federal laws, or public sentiment, prevented hunters in the South from slaughtering robins, meadowlarks and other such species. Game was killed almost without limit nearly the entire year, even into the breeding season. Few states had effective game laws, or any game wardens. At the beginning of the pres-

ent century there was almost no thought of the establishment of sanctuaries for the protection of wild birds and mammals. The need for such reservations was brought to public attention through the efforts of the Audubon Society.

The basis of conserving wildlife resources is scientific study and education. Organizing bird lovers of the country and distributing bird leaflets to the school children of the nation have been the important life work of Dr. Pearson. All these activities he describes in his book, for which we bespeak a wide reading, to the end that more people may understand the needs of our feathered friends. They would be even worse off than they are today were it not for organizations like the Audubon Society and the American Nature Association, which have emphasized the esthetic value of bird life and educated our people in the beauty as well as the economic usefulness of our wildlife resources. And our people would suffer with their loss.

The National Association of Audubon Societies will always be a living monument to the names of William Dutcher and T. Gilbert Pearson. For twenty-nine years Pearson served as its executive secretary, and, later, as its president. He followed faithfully the principle of never running the Association in debt, but ended each year with a cash surplus. At the time of his retirement in 1934, he had built up an endowment of more than a million and a half dollars. It was through his personal efforts that this Association was established on a permanent financial basis so that its influence on conservation of our wildlife resources may long continue to be felt.

If the feathered tribes of the country could read *Adventures in Bird Protection,* they would forever be putting an extra note in their songs for T. Gilbert Pearson.

W. L. F.

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How Many Waterfowl?

THE RESULT of the last "mid-winter inventory" of North America's waterfowl has been announced by the Biological Survey, whose observers "saw nearly 9,500,000 ducks and geese." The Survey further declares that this number "probably is not much more than a fourth of the continent's waterfowl." Thirty-eight million waterfowl in 1937 compared to at least a hundred million in 1930! Is this any number to brag about?

There are on the continent of North America, let us say, 140,000,000 people. Then each of us is the potential owner of about one-fourth of one duck (or goose). Conservatively estimating that there are a million hunters who consider that the waterfowl belong only to those who hunt, each would claim about thirty-eight ducks. Or, taking the half million who buy duck stamps each year, and think, therefore, that they alone have the say about waterfowl, each would claim seventy-six ducks, to do with as he pleases. In their imagined pride of possession some may even decide that they will try to kill as many of these as possible this year.

However, whether we place ourselves, for the moment, in one or the other category, if we have a proper appreciation of what a magnificent heritage came down to us, with no effort on our part, and realize how badly we have managed this bequest, we will decide not to kill another wild duck until this pitifully low population has been increased several times.

And if we were an influential member of the organization that is charged by law, and rightfully so, with protecting this heritage from destruction, we would use this shamefully low population as an argument for closing the season—no matter who did not like our decision.

The waterfowl cannot wait.

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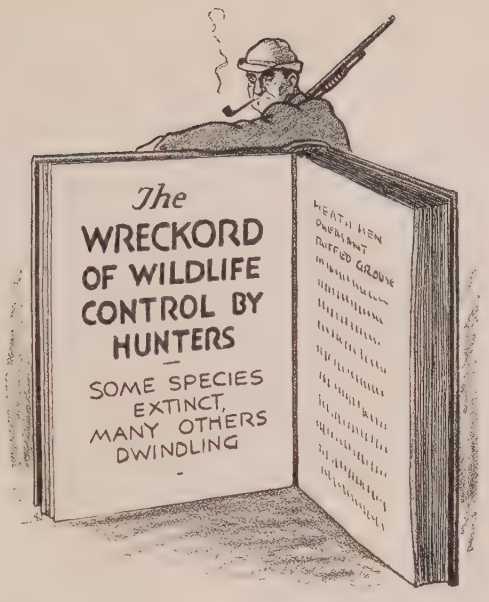
MEXICAN WILDLIFE TREATY SIGNED

THE FINAL link in the tri-party wildlife protection compact between the United States, Canada and Mexico was forged when the Foreign Minister of the latter country affixed his signature to the document, a fact made public by a Presidential proclamation of March 15. Laws and regulations under the treaty will be administered by the U. S. Department of Agriculture, which announced, through the Biological Survey, that 140 species and subspecies protected under the U. S. A.-Canada agreement similarly are protected under the Mexican pact. Species added to the protected list by the Mexican treaty include certain ducks, white-winged doves, mockingbirds, thrashers, horned larks, blackbirds, grackles, cowbirds, phainopeplas, buntings, finches and sparrows. Provision also is made for future inclusion of migratory species "which the Presidents of the United States of America and Mexico may determine by common agreement".

The act of Congress approved by President Roosevelt last June, providing for the amendment of the Migratory Bird Treaty Act of 1918 to make the law applicable to the treaty with Mexico as well as to the treaty in respect to Canada, automatically came into effect with the proclamation of the exchange of ratifications of the treaty with Mexico.

Provisions in the treaty limit migratory bird hunting to a maximum of four months in each year, close the season on ducks in both countries from March 10 to September 1 and establish refuge zones in which the taking of migratory birds will be prohibited.

The Hunter vs. The Sentimentalist



A look at the record of the hunter's control of wildlife shows a sad picture of species destroyed and others dangerously reduced

By ELLSWORTH D. LUMLEY

FROM the time the first man swung a stone axe against the skull of an animal the management of our wildlife has been in the hands of the men who killed—killed either for sport or for gain. Because there was an abundance of wildlife, those who were not hunters were generally indifferent as to the activities of the killers. Through the ages it has become almost an instinct among men who hunt to feel that they alone should manage and control all policies pertaining to wild animals. They too often feel that one who is not a hunter and yet shows an interest in conserving animal life is a meddler and a "sentimentalist". Many hunters believe that the non-hunter is not qualified and therefore should not be allowed to make suggestions or to aid in the management of either game or non-game animals. This attitude still persists in the formation of the Wildlife Federation in several of the states. The North American Wildlife Federation was conceived in the hope of bringing together for conservation the sportsmen, bird clubs, garden clubs, Boy Scouts, and similar non-destructive organizations. Yet at least two of the states belonging to this national organization openly exclude from membership any person not affiliated with a shooting club. This is purposely done so that hunters can keep organized control of all wildlife management.

One reason that much of our wildlife has now reached a crisis is the fact that we have ever accepted as truth the conclusions drawn by untrained outdoorsmen from their casual observations. We have been most reluctant to accept the word of the trained research man if it conflicted with general opinion or with general observations. Two examples will illustrate how much in error casual observations may be and yet how persistently men will believe the false conclusions drawn from them.

Hunters have on many occasions witnessed large hawks capturing game birds or eating those found dead. The conclusion naturally drawn has been that hawks kill the game birds and were therefore detrimental to man's interests. Trained field men have carefully studied the habits of hawks and found by laboratory examination of the game birds supposedly killed by large hawks, that in most cases the game birds were diseased, parasitized, or injured so they could not escape the hawk, or that they had died from injury, gunshot, disease, or some other cause. Large hawks seldom are capable of capturing healthy game birds. Another fallacy that has arisen from casual observation is the idea that shooting up coveys of game birds will strengthen and aid the birds by keeping them from inbreeding. Careful work on the part of scientists has shown that shooting up and scattering a rapidly diminishing species, such as grouse or quail, does absolutely no good. There is a natural tendency for flocks of birds to split up and reunite without the aid of man. Yet seasons on grouse and quail have been opened by game commissions on just such flimsy excuses as alleged inbreeding.

These two examples are given to illustrate the fact that men may spend a lifetime living with and observing Nature and yet draw erroneous conclusions from their observations.

When non-killers or scientists attempt to regulate shooting, "the game's best friend", the hunter, quickly proclaims that the "sob squad" is attempting to legislate out all hunting. Reforms in shooting are held up to ridicule as ill advised, unworkable, and petty nuisance regulations that do not save the game. Shortening the season, lowering the bag limit and possession limit, shortening the shooting day, outlawing baiting, live decoys, and pump guns have all been used by certain sportsmen to bolster up the old contention that added restrictions only make law breakers of the sportsmen.

Another common statement made by sportsmen in an attempt to prove that "maudlin sentimentalists" should have nothing to say regarding hunting regulations and conservation is: "The sportsmen buy hunting licenses, part of the proceeds of which pays for game protection while Nature lovers and non-shooters contribute nothing toward maintaining warden service." "Just why," one might ask, "is warden service necessary?" Certainly not to protect the wildlife from Nature lovers. Wardens are needed principally because there are hunters who must

be watched. That sportsmen find it necessary to hire men to act as referees to see that all killers play the game of shooting according to given rules, called game laws, certainly is no legitimate reason why a non-shooter should have no voice regarding the rules of the game. When hunting reaches a point where certain forms of wildlife are so greatly reduced that both hunters and non-hunters become alarmed, it is high time that those that have not taken part in the killing boldly demand that they be given a voice in the policies of game management.

Sportsmen seem to fear that the "swivel-chair sentimentalists" will deprive them of the joy of the hunt if given a voice in forming policies to govern the taking of game animals. If naturalists made the hunting laws undoubtedly some forms of hunting would disappear. Nature lovers, however, are not as much opposed to hunting as to the bad ethics of the sport. Hunters seem unwilling to recognize the fact that they alone are responsible for the many restrictions on shooting. Nature lovers are not to blame that men can no longer kill passenger pigeons, Eskimo curlews and heath hens. Sentimentalists can not be held responsible for the great reduction of buffleheads, canvasbacks, redheads, and ruddy ducks that has necessitated the placing of these birds upon the protected list. The killers themselves have been the cause of the restricted shooting. They have robbed not only themselves of the joy of the hunt but they have taken from thousands of Nature lovers the joy of watching and studying these beautiful forms of life.

The record left by hunters in their management of game and non-game animals is not one of which they can boast. They have used every killing device the genius of man has been able to invent, and when warned by a few far-sighted individuals that their killing methods would bring extermination and ruin they have turned a deaf ear and cried—"Sentimentalist". Now that a crisis has been reached and the nation is faced with the grave problem of saving some breeding stock, innumerable reasons for the shortage are offered by the killers, and we read and hear about drought, drainage, predators, disease, poachers, Mexicans, and new migration routes. Only the more liberal sportsmen admit that overshooting has been the chief cause of the depletion. Hunters as a whole are unwilling to admit the ruin they have wrought.

If our wildlife is to survive from the terrific punishment we have inflicted upon it, it must be placed in the hands of trained field men who are willing to study and accept the findings of scientific research. Occasionally such men are appointed to state fish and game commissions, but too often they are shortly removed because hunters object to progressive game management if it means fewer shooting privileges. Hunters' methods of game management have brought only ruin. If conservation is to be achieved, the lovers of wildlife, as well as the destroyers, must share in its management.

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IVY LEAVES

By WALTER W. GIBBANY

The ivy leaves on tiny stemlets swing.
  All face the light some time within the day,
And take from out its depths the choicest ray
  To feed the parent plant the light of spring.
None but the purest ray does each leaf bring
  From out the varied hues of shim'ring light,
That naught may come the parent stems to blight.

  O grateful leaves, to me a song you sing,
You nurture that which gives you life and food,
  You give it light, it gives you strength, I would
That we should deal in such a fair exchange
  Among ourselves; and let our efforts range
Throughout the land to find who need our light
  And give to them our hope, our love, our might.

Things to Think About

America's rare and rapidly disappearing relative of the European peregrine falcon, our duck hawk, this season will be the object of a census of pairs breeding in our National Parks, made by Park Service wildlife specialists. Great reductions in the number of these birds have been noted for generations. Shooting by hunters exacts a heavy annual toll, and egg-collecting and removal of the young from their nests are considered by the Park Service field workers to be major factors in the steady decrease of the birds nesting in our territory.

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The Biological Survey is carrying on nine cooperative wildlife research projects at nine land-grant colleges in Alabama, Connecticut, Iowa, Maine, Oregon, Texas, Utah, Virginia and Ohio. The investigations under way are expected to determine the best methods of increasing, maintaining and managing our wildlife resources. Demonstration areas at each college will prove whether facts found by the research can be used in developing and improving methods of forest fauna management in the multiple uses of forest lands.

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Waterfowl and Common Sense is a pamphlet written by Irving Brant, and distributed by the Emergency Conservation Committee, 734 Lexington Avenue, New York City.

It is a forceful and authoritative plea to everyone interested, from the President down, to work for closed seasons until our waterfowl are safe from the imminent threat of extermination.

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Although inactive since the National Association of Audubon Societies took over its work, the Hawk and Owl Society, whose members are intensely interested in the conservation of raptores, are planning to renew their activity. At a recent meeting of the Organization Committee of the Society, it was decided, because of the vast amount of material that is scattered among the Society's members, to obtain this information from them and compile it into a unit that would be invaluable to the conservationist. The committee accordingly selected the duck hawk, with its wide range, broad interest, and comparative ease of tabulation, for the first species to be considered under the plan. Questionnaires, now being drawn up, will be sent to all members of the Society. R. A. Herbert and J. J. Hickey, of 2952 Marion Avenue, New York City, have been appointed to handle the details of the study.

The Senate has passed Senate Resolution 113, requesting the Commissioner of Fisheries to explain the effect the Bonneville Dam of the Columbia River will have on the propagation of salmon and other commercial species. Senator Frederick Steiwer of Oregon, author of the resolution, said, on the floor of the Senate, that he had "talked with the Commissioner of Fisheries, who tells me that he has no objection to the request and is in a position to comply with it." The report should be interesting.

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Fashion note: According to *Vogue,* which, we are advised, should know, the ladies will wear "Audubon bonnets" this year. These will be trimmed with "flying quills" or with the "wings or any brilliant plumage of birds". This appears to be a rather general and inclusive fashion prescription, somewhat more than faintly reminiscent of "the saucy little bird on Nellie's hat". While it may be that the makers of items for feminine adornment can produce synthetic feathers, and even wings, such a fashion trend augurs ill for any of our birds of brilliant plumage. We will appreciate receiving reports of any identifiable wings of wild birds seen on women's hats. Selecting Audubon's name for the name of these "bonnets" is, indeed, the crowning touch.

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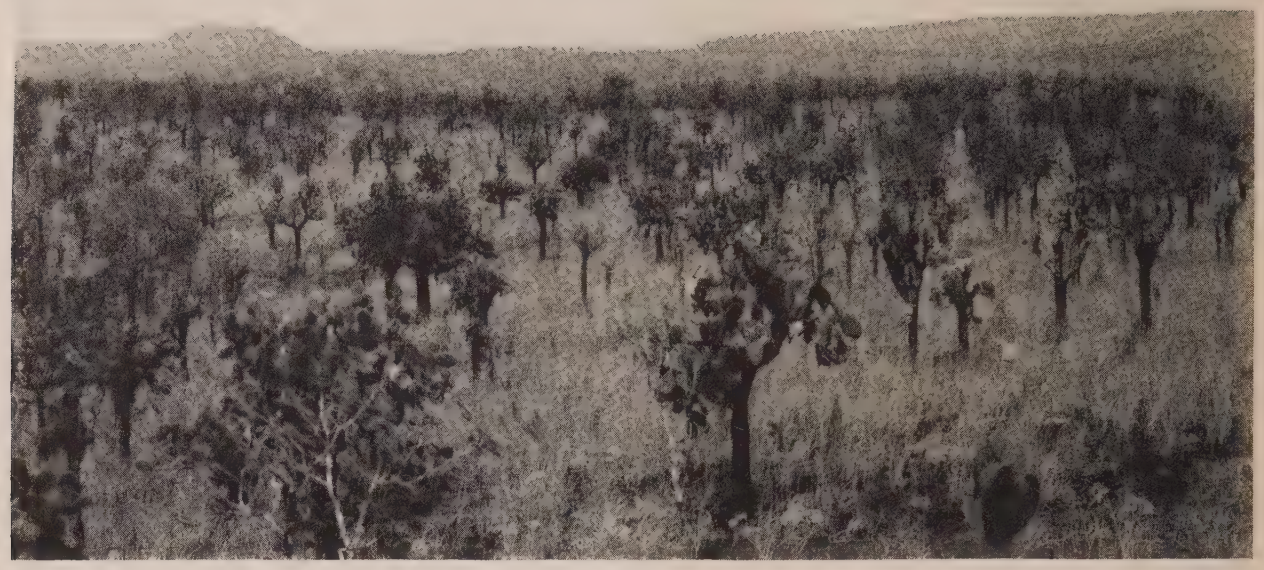
The Norris Forest Resources bill, authorizing an appropriation of $2,500,000 to develop the forest resources of the nation, has passed the Senate. Under terms of the measure, the Government would be authorized to establish three nurseries and to cooperate with the states in measures for the protection, development and extension of forest areas. The purpose of the legislation is to carry the services of the Forest Service to the ordinary farmer in all parts of the United States. It authorizes the cooperation of the Federal Government, through the Service, to encourage proper care and improvement of existing farm woodlands and to assist the ordinary farmer in the proper protection and intelligent cultivation of the millions of acres of woodlands throughout the United States. In short, the bill undertakes to bring about cooperation between the farmer and the Forest Service, which, in the words of Senator Norris, author of the bill, is "something that I wonder why Congress has never attempted to do before." The bill "will enable the Forest Service to enter upon a program in connection with agricultural colleges, extension services, and farm organizations, with a view to getting them to cooperate and improve the woodlots of the United States," Norris said.



A TYPICAL GALAPAGOS LANDSCAPE

This panorama of Barrington Island, one of the smallest of the group, shows the cactus plants that form an important part of the diet of the land iguanas. On this island only is found the rare pallid iguana

GALAPAGOS LAND IGUANAS

Their origin and distribution present many zoological problems

By WOLFGANG VON HAGEN

Photographs by the Author

IN APPEARANCE and structure the common Galapagos land iguana, *Conolophus subcristatus,* differs from his immediate relative, the sea iguana. Its tail is shorter and not as essential to his well being as is that of the semi-amphibious *Amblyrhynchus,* for *Conolophus* has no need to swim. The head of the land iguana is longer, wider, with the snout rather pointed, and the body is heavier. The land iguana lives in a deep inclining burrow, which it digs with its stout claws in the soft soil between or beneath rocks. When night falls, and even on cloudy days, it remains in its cavern. Approximately at eleven o'clock in the morning, when the earth warms up, these lizards crawl slowly out. Gradually their bodies become warmed by the sun's heat, and when thoroughly aroused, the lizards feel like eating. Their food is entirely vegetable, but from necessity they are not choice, feeding on cactuses, as well as grass, and the foliage, flowers, and berries of various plants.

Like other species of the Galapagos reptilian fauna, the tortoises and the sea iguana, the land iguanas are peculiar to this unique archipelago. The various species are found nowhere else in the world, and their distribution on the various islands presents a number of puzzles. On the islands of Narborough and Seymour lives the large

AN IGUANA PROFILE

The land iguanas of the Galapagos, reminding one of the giant reptiles of prehistoric times, are persisting on several of the islands. The largest reach a length of about four feet

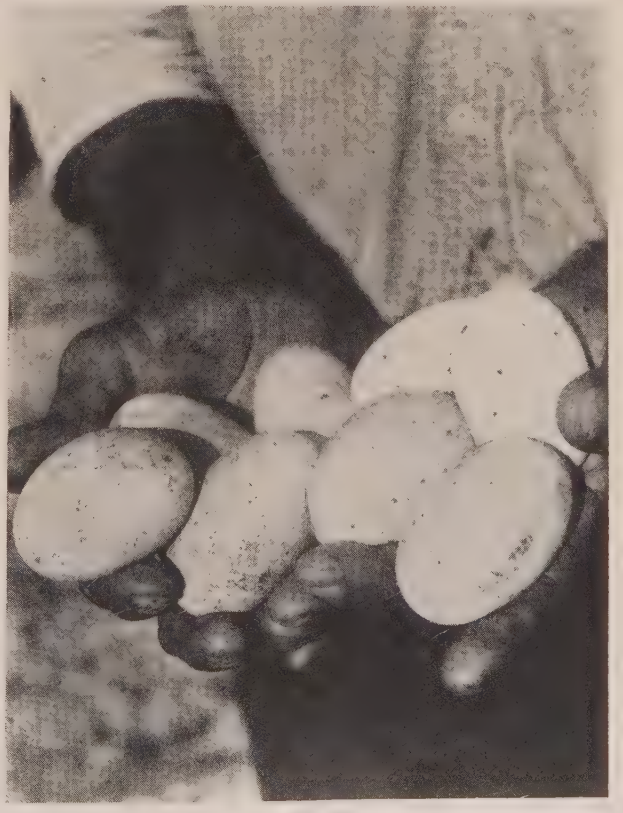
CACTUS SPINES NO WORRY

The land iguana scrapes off the more objectionable spines with his claws, tears pieces from the plant with his powerful jaws, and swallows his food without chewing it

yellow-crested species, *Conolophus subcristatus*. On Barrington Island is *Conolophus pallidus,* a species found nowhere else. On Cerro Colorado, Indefatigable Island, the author has found still another species that approximates the Seymour iguanas, except that it is brick red and golden, and inhabits only a restricted part of two islets. How did these land iguanas, unable to swim, become distributed on several islands and then only on small points of the islands? At present, we do not know. But we do know that there are about a dozen species of lizard, each with its problems, besides those here specified.

In habits, however, all the land iguanas resemble each other in one respect, that of feeding on cactus. This supplies them with water as well as food. Clumsily, as if they were digging their burrows, they scrape the more obtrusive thorns from the pad, and, with no more ado, go to work on the cactus. Their jaws are widely angled and powerful, and they proceed with their meal by clamping down on the pad and pulling off large bites. Then their head is thrown back and the cactus worked down the throat. The large reddish tongue moves about during the process, apparently crushing the material against the roof of the mouth. The form of teeth forbid thorough mastication, and since the stomach is not well-developed, the large intestine does most of the digesting.

Unlike the sea iguana the land species are somewhat vicious and will bite. And when one has felt these jaws shut down on his hand, he will henceforth give them a wide berth. It takes two powerful hands to force open the jaws, once they have closed with a tenacity akin to that of the bull-dog. Yet, correctly handled, they are harmless. Capturing them is rare sport. At Barrington Island, the terrain is generally level and the ground good for travel. As they are highly esteemed for food the Barrington iguanas have been rather badly persecuted, for it is the custom of the fishermen when passing to take along a few. When the day is intensely hot, one will be able to see them all over the rocks, lying with eyes half closed, bathing in the sun's rays. They will allow one to approach just so close, and then the chase begins. Our native servant, Truviño, was an old hand at the game. With nothing on his feet but sandals cut from old rubber tires, he would pursue the creatures, never slacking for a moment. Up the hills, through the bushes, under huge cactus trees, the chase goes on. The iguana seeks a hole, a fissure in the rocks, and the pursuer seeks to keep so close behind him that he will not be able to make up his mind to dart into a crevice. Eventually the iguana stops and turns breathless in its tracks, its sides heaving. With open mouth it defies its pursuer. At this moment one sees the personification of the phrase "with blood in his eye". The eyes of the pallid iguana have turned from a light gray to blood red; so red that one expects blood to be ejected in the manner of the Arizona horned lizard. Once cornered, the land iguana is as good as in the bag. Swiftly I reach behind to get it by the tail, the open mouth snaps shut—but on empty air. Truviño runs up with the bag,



EGGS OF THE LAND IGUANA

These eggs are somewhat larger than a hen's. The shells are leathery and will stand rough handling

the lizard is shoved in, and our first specimen is secure.

A female that was observed laying its eggs in a burrow deposited seventeen. Like those of all such reptiles the eggs hatch by whatever warmth penetrates the soil where they are laid. Although many thousands must hatch out every year, it is a remarkable fact that the small young ones are seldom or never seen. During months at the Galapagos, we saw only the matured, older ones. Even some natives, in their eternal peregrinations over the volcanic isles, have never seen the small young. The sea iguanas, more gregarious than the land species, have the young ones with them all the time. The little fellows, seemingly just hatched from the egg, are eminently conspicuous. The placing of the eggs of the two groups, and, undoubtedly, the subsequent development of the young and the accompanying hatching are similar, and it is, therefore, curious that the young are so secretive.

The two types of iguanas, and their distribution, rank as one of the most interesting Galapagos fauna puzzles. Darwin himself has remarked that nowhere in the entire world, save on the Galapagos, could one find so characteristic a group having its terrestrial and marine species belonging to so confined a habitat.

Like other zoological puzzles of the Galapagos Islands, the final solution of the origin of the islands themselves, and of the manner in which the original sparse fauna arrived, may solve some of the questions concerning the detailed distribution of the land-inhabiting iguanas.

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THE TUATARA

By EDITH M. LAING

NEW ZEALAND not only boasts of its strange birds but also of a lizard-like creature found in no other land. By some curious combination of geological circumstances that persisted during the ages, a peculiar primitive type of reptile, considered by scientists as the only "living fossil" among the reptiles, has been permitted to survive in much its primitive form.

The tuatara, only surviving representative of the ancient order of Ryhnchocephalia, is pictured on the eightpenny stamp of a recent New Zealand issue.

It is a harmless creature about eighteen inches in length, with a superficial resemblance to the iguanas. One of the oddest things about it is a rudimentary third eye. Although as in the case of most reptiles its eggs are buried in the sand, and their incubation is intrusted to the elements, the young do not emerge the first season. The eggs are laid about the first of the year (the southern summer) and the embryos are well developed by August. But their growth is then arrested, and after undergoing a sort of hibernation within the egg they emerge about thirteen months after the eggs are laid. In the days of the native Maoris, the tuatara enjoyed a care-free existence, happily feeding on worms, insects, and small crustaceans. But, since the advent of the white man with his dogs, cats, pigs, and ferrets this unique species has been almost exterminated. Most of the survivors are now found on a few rocky islets off the mainland.

Needless to say, this curious relic of a bygone geological era is of great interest to science, and many a naturalist has travelled thousands of miles to make its acquaintance and study it firsthand, for the light its physical characteristics shed on the origin of reptiles.

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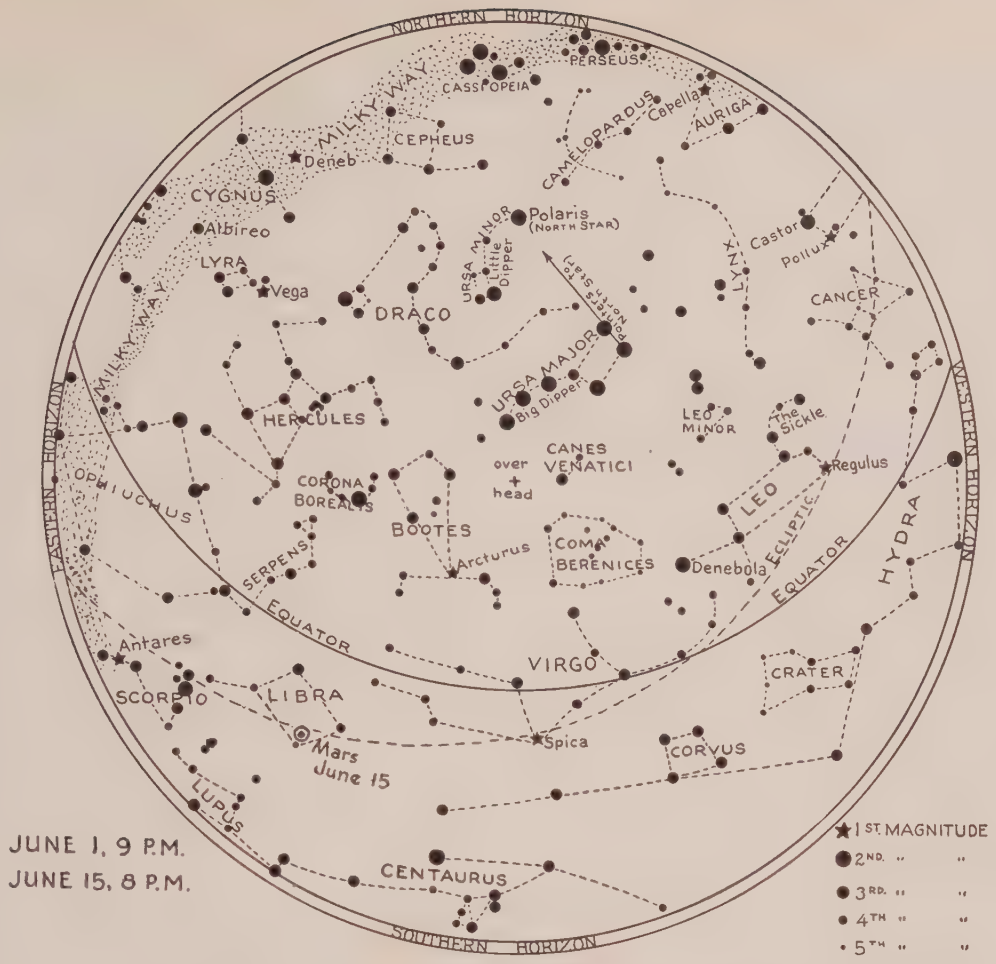
DANCE OF THE ROBINS

By MILDRED H. SISSON

The robins danced for me today:
I saw them trip upon the grass—
On new green, lovely for their feet,
They tripped a gay six steps or so,
Then stopped and straightened up—
The way I've seen plump tenors do
Before they sing. They tripped again
And straightened, tripped and straightened up,
And then they hopped a little way.
With trips and stops and hops they danced today.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

Expeditions Await June Eclipse

By ISABEL M. LEWIS

Less than a year has passed since eclipse expeditions were setting up their instruments in the Soviet Union and Japan, and on the island of Chios in the Aegean Sea, to observe the total solar eclipse of June 19, 1936. Now scientists are gathering in the path of another eclipse, in another part of the world, to make observations that can be made only during the all too brief and infrequent moments when the solar corona, which can be seen at no other time, flashes forth in all its ethereal splendor, while the sun is completely covered by the moon.

The eclipse of June 8, 1937, will be, in one respect, more remarkable than any that has occurred in at least twelve centuries. It will have a duration of totality lasting seven minutes and four seconds at one point in its path in latitude 9°56′N. and longitude 130°27′W. where the sun will be on the meridian at mid-totality. This is only 26 seconds short of the greatest possible duration for any total solar eclipse, which is seven minutes and thirty seconds. Eclipse paths have a way, however, of favoring the most inaccessible portions of the globe. The exceptionally long duration of the June eclipse will occur at a point in the Pacific Ocean more than 1200 miles from the nearest land. Scientists who are travelling either to Peru or to uninhabited isles in the Pacific will have to content themselves with a duration of only three and a half or four minutes. With the exception of a few small coral atolls, and a narrow strip in Peru, where the eclipse occurs near sunset, the path of this eclipse will touch no land in its entire course across the Pacific Ocean from the Ellice Islands, where it will first touch the earth at sunrise, to that point in Peru where it will leave the earth at sunset.

On one or the other of two tiny coral atolls of the Phoenix group, Canton and Enderbury Islands, will be a small group of observers from the U. S. Bureau of Standards, U. S. Naval Observatory, and several other observatories and universities, whose expedition is sponsored by the National Geographic Society. This party is under the joint leadership of Captain J. F. Hellweg (retired) of the Naval Observatory, and Dr. S. A. Mitchell of the

Leander McCormick Observatory. Members of the eclipse party will be transported from Honolulu to the islands by the Navy tender *Avocet*. Whichever one of these two islands, only thirty-two miles apart, proves to be the more suitable will be chosen as the eclipse site. The duration of the total phase on Enderbury Island will be about four minutes, nine seconds, the maximum for any point on land within the path, while the duration on Canton Island will be about three minutes, thirty-five seconds. The last-named island is some distance from the center of the path, which accounts for the shorter duration of totality, but the island will afford better landing facilities and better shelter.

On both islands the eclipse will occur about 7:45 A.M., local time, and the sun will be about twenty-three degrees above the horizon. It will be necessary to transport not only all scientific instruments and photographic supplies, but also everything that will be needed by the observers during their sojourn of several weeks, including water as well as food. The islands are both uninhabited and are not much more than desert wastes without vegetation or water. The ship will stand by during the entire period that the expedition is on the island. Heavy surf and dangerous landing will add to the difficulties that are to be overcome on these low-lying reef-encompassed islands. Yet the weather prospects are excellent on both islands. Three expeditions in the past have successfully observed eclipses on coral islands of the Pacific, the first on Caroline Island in 1883, a second on Flint Island in 1908, and the third, the Naval Observatory eclipse expedition to Niuafou, or Tin-Can Island, of the Tonga Group in 1930.

In Peru a maximum duration of three minutes, twenty seconds will be obtainable near the coast with the sun at an altitude of about eight and one-half degrees, about half an hour before sunset.

The Hayden Planetarium-Grace-Peruvian expedition with Dr. Clyde Fisher, Curator of The Hayden Planetarium of the American Museum of Natural History in New York City, as its head, will occupy several sites in Peru. Members of the expedition will travel on Grace Line steamers by way of the Panama Canal to Lima, and then by rail, steamer, or plane to points in the path near Trujillo, Chimbote, Casma, Huaraz, or Cerro De Pasco. The eclipse will not be total at Lima, the central line passing a few miles north of Chimbote. At Trujillo, the second largest town in Peru, the total phase of the eclipse will last about two and one-half minutes and the sun will be at an altitude of more than nine degrees. Weather predictions for Peru are also excellent. Coastal fogs that are prevalent at this time of year on the coast of Peru are low-lying and disappear in the arid region a few miles inland. In the coastal range at an elevation of several thousand feet there is an eighty per cent probability of clear skies.

Dr. Irvine C. Gardner of the Bureau of Standards, who was a member of the Harvard College Observatory expedition to Ak-Bulak in the Khirgiz steppes last year, will take his nine-inch lens, which was made at the Bureau of Standards and is of his own design, to Enderbury or Canton Island as a member of the National Geographic Society expedition. With this lens at Ak-Bulak last year Dr. Gardner obtained some remarkably fine photographs of the solar corona. These include the first color photographs of the solar corona ever obtained.

During the coming eclipse, attempts will be made to obtain both black and white and color photographs of the corona, and one member of each expedition will attempt paintings of the corona. Radio, magnetic, meteorological and spectroscopic observations will be made.

The brilliant sunset colors that are such a beautiful feature of totality should be particularly noticeable in Peru because of the low altitude of the sun during the total eclipse. Another most interesting feature of the eclipse in Peru will be the tremendous velocity with which the moon's shadow will approach and recede. Normally travelling at a speed of about a half-mile a second, on the coast of Peru it will attain a velocity of about five miles a second! This is due to the fact that the shadow is nearly tangent to the earth's surface, and its motion relative to the earth, therefore very great, near the beginning and ending of its path, where the eclipse occurs near sunrise or sunset.

At the time of the eclipse the sun will be in Taurus. On Enderbury or Canton Islands, where the eclipse occurs in the early morning, the planets Mercury and Venus may be seen during totality, when the brightest stars and planets appear, but as they lie west of the sun, they cannot be seen in Peru as they will be below the horizon at the time of total eclipse. Aldebaran also will be seen at the Pacific stations but not in Peru. The second magnitude star, Beta Tauri, will be northeast of the sun and should be conspicuous and possibly also Betelgeuze in Orion, Capella, and the brightest stars in Gemini, all near the sun at that time.

Mercury will be at its greatest western elongation on June 6, but is not well placed for observation because of its low altitude at sunrise. Venus is now a fine Morning Star. It is at its greatest western elongation on June 26 and is high in the sky at sunrise.

Mars is conspicuous in the evening sky, surpassing in brightness all stellar objects above the horizon with the exception of Jupiter. It is now in Libra some degrees northwest of Antares. Jupiter is in Sagittarius and is visible most of the night. It is increasing in brightness as it approaches opposition. Saturn is in quadrature with the sun on June 26, when it will be due south at sunrise. It is in the constellation of Pisces.

Summer will begin on June 21 at 10:12 A.M. Eastern Time when the sun will be farthest north of the equator. This will be the longest day of the year in the northern hemisphere. On this date, the earth will reach aphelion, the point in its orbit that is farthest from the sun.

Meet Our Authors

Arthur C. Twomey, formerly a lecturer in ornithology at the University of Illinois, has spent five summers in the Hudson Bay area, studying the bird life of that region. At present he is connected with the Carnegie Museum.

Lt. Elliott Roberts, an official with the United States Coast and Geodetic Survey, is particularly qualified to write about the changing contour of the land beneath the surface of the sea.

Edmund J. Sawyer is an ornithologist and Nature artist whose illustrations have appeared many times in NATURE MAGAZINE. At present he is on the staff at Cornell University.

Carroll Lane Fenton, geology and paleontology student, is well-known for his *The World of Fossils* and other works. Dr. Fenton recently has been studying the geologic formations of Glacier National Park and the Canadian Rockies.

Donald C. Peattie is well-known for his many books and articles on Nature subjects, his latest being *Green Laurels*.

Stephen Haweis, artist and writer, is a British subject residing in Dominica, British West Indies.

Wolfgang von Hagen was born in St. Louis, Mo., and educated in Europe. He has spent much of his time studying the flora and fauna of the Galapagos Islands, but his specialty is the morphology of termites, a complete collection of which, taken in Ecuador and Galapagos, he has presented to the American Museum of Natural History.

The Appreciative Dove

It is the opinion of Dr. G. W. Whitney of Auburn, New York, as it is the opinion of many of us, that birds have a thought process that is closely similar to man's. At any rate, Henry Kerr, a friend of Dr. Whitney who was in the habit of feeding the doves that frequent the city in large flocks, was surprised one day to have one of his feathered friends fly through an open window and alight on his desk. An examination of the bird disclosed a broken leg. Mr. Kerr set the leg and returned the bird to the flock after it had healed. After this humane treatment, this same dove would fly to her benefactor wherever she found him on the streets of Auburn, and a few weeks later brought two young ones to the window sill to show them off to her friend.

All Hail the Brazil Nature Club

An inspiring example to Nature study groups throughout the country is the record of the Brazil Nature Study Club of Brazil, Indiana. The group, since its inception ten years ago at the home of Mrs. Nelle D. Hubbard, who at present is the corresponding secretary, has set a record of accomplishments of which any Nature Club would be proud. To tabulate them all would require a full page, but we list a few to show how a Nature Club can be an organization that a community cannot do without.

It has planted many shrubs, in cooperation with the local Public Library Board, to landscape grounds; has given bulbs and plants to the county orphans' home; planted a George Washington memorial tree and regis-

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Nature Magazine in School

A Department of Aid to the Teacher

Birds of the Midnight Sun

This article gives a remarkably clear word picture of the fierceness of the struggle that living things must undergo in the far North, even when man does not complicate the scene. Pupils might compare conditions affecting bird and animal life in the Arctic and Temperate regions. Some idea of the remarkable adaptations making life possible in such a land may be obtained from pictures of these birds. For instance, the type of feet and legs indicates whether a bird spends most of his time swimming, wading, or on the land. The type of bill indicates the kind of food eaten, as cone-shaped—seeds; sharp-pointed and slender—insects; hooked—flesh; shovel-shaped—scavenger. The downy undercoat of feathers worn by birds in the Arctic regions enables them to withstand the cold to some extent.

●

Guideposts of the Sea

If, as adults, the children now in school are to support the departments of our government devoted more or less to pure research, they must early acquire a sympathetic attitude toward such investigations. This article indicates the economic value of the work of the Coast and Geodetic Survey. Pupils should be encouraged to look up the work of other government bureaus and report instances of their contributions to our national well-being. A background for these reports should be built up by a study of the dramatic elements in the lives of men who have been or are now in these services. In this connection interesting weekly broadcasts are being given under the auspices of the Smithsonian Institution. In reading articles such as this, dealing with a new field of discovery, pupils should appreciate the time element involved in the collection of data, the untiring patience of the investigator and the thrill of conquest as new knowledge is won.

●

A Bird Personality

Toward the close of school, when many species of birds have become more intimately known, pupils who have gathered a store of observations and knowledge of birds by reading could write biographies of favorite birds, using this article as a guide. During the summer pupils should be encouraged to watch the birds without disturbing them. As a vacation activity a notebook might be kept, recording the color, size and song of the birds.

●

Plants with a Poison Touch

A group of well-known biological experts were once on a hike in the woods. Their path led down a steep ravine. Each one in turn took hold of an innocent-looking little tree to steady himself down the hillside. Only one of the party recognized the tree. He asked the others what kind of a tree it was. The unanimous reply was, "Ash!" A few days later the members of the expedition could be identified by the brown streaks of potassium permanganate which had been applied to allay the itching.

When it is possible to collect specimens of poisonous plants, they may be safely brought into the schoolroom if they have been sealed in a glass jar, the outside of which has been washed with alcohol to be sure that none of the poisonous oils remain there. Each spring, before a trip to the woods is taken, a lesson should be given on the identification of the poisonous plants of the region. Before the class is taken out the teacher should go over the ground, noting the location of poisonous plants, planning to take the pupils near enough for them to see these without being poisoned.

●

In order that teachers and parents may further use Nature Magazine as an aid to the study of Nature and Science, this page is devoted to the following brief notes based upon articles in this issue and suggesting ways in which they may be used as a source of inspiration and information. To bring these Nature study thoughts to our readers we have obtained the services of one eminently qualified for the task, and this department is edited

BY ESTHER SCOTT

Instructor in charge of Elementary Science
Washington, D. C., Schools

Every Day in Certain Ways

It would be worthwhile to put this article in the hands of older pupils and let them discuss it. Some pupil in the junior or senior high school would have sufficient background to lead such a discussion. This pupil should be referred to this article and to the Balance Experience Realm in NATURE MAGAZINE'S *Guide to Science Teaching.*

In the elementary school, the more we can interest our classes in natural history the more they will want to protect the creatures of the wild. In addition to the facts that may be brought out in the classroom, this can be accomplished through having school pets, or through Nature clubs. By taking walks in the woods, by association with some adult conservationist of the community, by having the lives of naturalists presented in such a way that the elements of hero worship carry over, these young persons will grow bit by bit into mighty advocates of conservation.

●

The Hunter vs. the Sentimentalist

Why is it that the hunter has had such control of legislation affecting wildlife? Is it possible to change the story in the future? Such questions rest with the more conservative Nature lovers and "sentimentalists". These cultured people, with their more truly scientific attitudes, are able to view facts as they really are and listen to the advice of experts. They have it in their power to change the whole wildlife picture. In twenty years this could be accomplished by systematic effort concentrated upon the children who today are in our elementary and nursery schools. There are two ways by which the school can be reached. One is by the teachers themselves; the other by the citizens who have the interests of conservation at heart.

First, then, there is the course of study. Does it provide any ideas contributing toward an appreciation of the interdependence of species? In order to accomplish this there should be lessons dealing with the care of pets; wild birds; the homes of animals; animals needing the protection of man; the life processes of plants and animals; the community life of the forest; the interdependence of life in a garden. When pupils have reached the sixth grade there should be a long unit dealing with the problems of conservation. However, courses of study do not go far enough when they stop with such ideas as these; we must try to teach ideals too. At the present time groups of teachers from the Washington, D. C., public schools, in cooperation with the George Washington University, are making a study of the science course in the elementary grades to evaluate its contribution toward the building of such attitudes as open-mindedness, habit of looking for cause and effect relationship, habit of accuracy and habit of generalization. Such an article as this gives splendid opportunity to train the pupils in these desirable habits. Does he search for truth regardless of personal prejudice? Does he suspend judgment until all the facts are in? In looking for the true cause and effect relationship, does he distinguish between belief and experimental proof? Does he discriminate, evaluate and verify statements heard or read, and things seen? Does he have an intelligent respect for authority?

●

Expeditions Await June Eclipse

In a study of the coming eclipse, it would be desirable to integrate history, geography and natural science. By a comparison of the real cause of an eclipse with the beliefs held in former times, pupils can appreciate to some extent the change in ideas concerning the world resulting from an advance in astronomy. This tends to make them more tolerant as they realize that knowledge is constantly changing. In this connection they can read about eclipses which decided the fate of battles, due to the superstitious belief of one of the armies. Experiments can be easily performed to show the real cause of an eclipse, using a globe, an orange and a source of light. These materials represent the earth, the moon and the sun respectively. By moving the "moon" between the "earth" and the "sun", a position will be found where the shadow of the moon falls on the earth, thereby hiding the light at this point. The path of the shadow may be located accurately on the "earth" by reference to this article. If pupils ask why the moon, which is so much smaller than the sun, can cut off the light of the sun, they can compare the apparent size of two spheres of the same size when one is near the observer and the other is some distance away.

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Robert T. Smith, 316 West 95th Street, New York City

tered it with the American Tree Association; built the rock garden at the county hospital and furnished the plants for it; made yearly contributions to the Red Cross and other relief organizations; and made NATURE MAGAZINE one of the official periodicals of the club. Furthermore, all members provide feeding places for birds, and the club as a whole helped to buy food for quail during the winter. We sincerely hope the next ten years of the club's existence will be as worthwhile as the first ten.

Amazon Palm Exhibit

An important collection of botanical material has been presented to Field Museum of Natural History, Chicago, by Mr. H. F. Johnson of Racine, Wisconsin. The specimens collected by B. A. Krukoff consist of leaves, flowers and fruits of palms of the Amazon region of South America. Some of the leaves in this collection are 35 feet long and clusters of the fruit weigh as much as 100 pounds.

Nature School

The Massachusetts State College's Nature Guide School, located on the northern boundary of Mt. Toby Forest, is accepting registrations for their summer courses. Courses offered this year include bird study, a study of plant and animal life of streams and ponds, a leadership course in the practical aspects and problems involved in Nature guiding, and a practical course in which a student takes a problem related to his major field and works it out at camp. The latter can be made to extend over the full four years. Those interested may secure further information by asking for the Catalog of Summer School from the Director of Summer School, Massachusetts State College, Amherst, Mass.

PLANTING NOOKS & CORNERS

(Continued from page 344)

trail over them, such as English ivy or wintercreeper. Even periwinkle, as it trails over the wall, will give a charming effect.

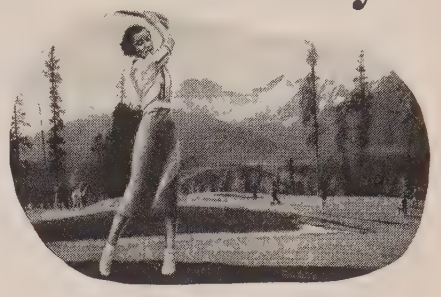
That bare space on the back of the house, where you have always wanted something but felt the two feet between the house and brick paved terrace was insufficient, may be planted to a Maack honeysuckle, redbud or mock-orange. It will have to be pruned to a few upright branches and kept that way by constant pruning, but, as it branches out seven or eight feet up, it will be just what you want.

Ugly telephone poles, if they cannot be covered with woodbine or trumpet vine, can be hidden by an upright growing tree such as the Bolleana poplar, or Moline elm. Either of these is preferable to the Lombardy poplar, which is so often injured by twig blight and scale.

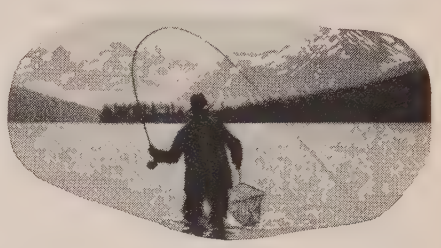
The retaining wall your neighbor built and didn't bother to make attractive can be covered with Boston ivy, woodbine (clinging form), English ivy, wintercreeper, or evergreen bittersweet. Or you may train a shrub up it, using the *Cotoneaster horizontalis* or

(Continued on page 377)

Like to Play?



Like to Fish?



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NATURE IN PRINT

As a convenience to readers the books reviewed in this department of Nature Magazine may be ordered through the book department of the American Nature Association.

New Garden Books

Green Grows the Garden, by Margery Bianco, is a collection of delightful garden stories full of facts and fun. Everybody who has a hobby likes to talk about it and here we have entertaining, sprightly experience stories about growing flowers from the seed, making a rock garden, "house cleaning" in the garden and other garden adventures. The Macmillan Company, New York, is the publisher and the price is $1.50.

A guide book that the new gardener will appreciate is *The Gardener's First Year,* by Alfred Bates. The first-year gardener who stands bewildered in brand new overalls, newly bought spade, rake and hoe in his hand, will find this volume a friend indeed. The author, in simple direct words, gives explicit and practical directions for preparing the soil, using proper fertilizers, sowing the seed and protecting the shoots from insects. How to make a garden in full bloom the first year is practically guaranteed. The book is published by Longmans Green and Company, New York, and is priced at $2.00.

The fifth annual issue of *Gardens and Gardening,* edited by F. A. Mercer, is a beautiful volume profusely illustrated with photographs of flower gardens from all parts of Europe and the United States. The excellence of the natural color photography is especially noteworthy. The work was produced by the cooperation of the owners, architects and landscape designers who supplied the photographs, and the gardening authorities who have contributed special articles on dahlias, herbaceous plants, summer flowers and Japanese miniature trees. The book is published in America by The Studio Publications, Inc., New York; in London by The Studio, Ltd., and is priced at $3.50 in paper, $4.50 in cloth.

Jubilee

Jubilee was born in the London Zoo on February 15, 1935, a tiny and delicate baby chimpanzee. Girl-baby chimps are not often born in captivity, and Jubilee—named, of course, for King George's jubilee year—was an event. Her babyhood was precarious and she was cared for like a delicate child. Jubilee grew, proved to be an engaging personality, unaffected by the publicity that attended her progress. Finally she was able successfully to celebrate her first birthday with a birthday party and cake, the ceremony being attended by hordes of London children. The story of Jubilee is delightfully told by Lorna Lewis in a book named simply *Jubilee.* The text is supplemented by a wealth of appealing pictures. The book is published by Harper and Brothers at $1.50.

Weather Rambles

The why of the weather is fascinatingly told by Dr. W. J. Humphries in his book with the above title. It is a book of rains and snows; of prairie twisters; of clouds, sun and stars; of much that is odd and interesting about both good and bad weather. Dr. Humphries, as a Meteorological Physicist of the United States Weather Bureau, has spent a lifetime prowling about in all sorts of weather and has compiled a large store of weather wisdom, all of which is interestingly told in *Weather Rambles.* The volume is available from the Williams and Wilkins Company, Baltimore, for $2.50.

Gourds for the Garden

The care and cultivation of gourds and their advantages as garden plants and as decorations are interestingly discussed in L. H. Bailey's new book, *The Garden of Gourds,* available from the Macmillan Company, publishers, New York, for $2.50.

Man's Best Friend

A delightfully interesting book on the friendship that can exist between a dog and his master has been written by Damon Dalrymple. In this book the author and his pet are enviable chums. Their understanding of each other is so complete that the book reads like the adventures of two humans. Every dog owner who reads it will obtain a wealth of information on how better to understand every wag of his own pet's tail. Interwoven with the story of his dog is a sobering thread of philosophy on the Tree of Life, the author being the fruits of one branch, his dog that of another. In the final chapter this philosophy is built into a stirring climax. The book, *My Dog and His Master,* is priced at $1.50 and is published by Dorrance and Company, Philadelphia.

Micro-projector

Recent manufacture of a simple microprojector with a considerable range of magnification introduces a new method of teaching zoology, embryology, and related sciences, greatly increasing the rapidity and accuracy of the work done. Coupled with this is an ingenious projector stand that has been perfected by Arthur D. Whedon of North Dakota State College. The stand, simple in design, is made of wood, with a metal track that enables the instrument to be moved upward or downward to the desired height. Complete details can be obtained from the Bausch and Lomb Optical Company, Rochester, New York, by asking for the March issue of their publication, *The Educational Focus.*

The Trailer Home

Trailer travelers who pick up and go when the spirit moves them will find *The Trailer Home* by Blackburn Sims interesting, instructive and valuable. The author is a veteran of more than 150,000 miles of trailering and has written a volume that is essentially a guide for those who are following or are thinking of following the call of the open road. Dedicated "to all land sailors. . . who always go to see in a trailer," Mr. Sims work could well be made a compulsory textbook for those contemplating taking their home with them on motor trips. It is available from Longmans Green and Company, New York, for $1.50.

British Trees and Shrubs

The amateur botanist of the British Isles, or the visitor to Britain who wishes to know its trees and shrubs intimately, will find F. K. Makins' *The Identification of Trees and Shrubs* a distinct boon. Describing more than 1700 species and supplied with a key comprised of 2500 diagrams, this is a practical book. It is published by E. P. Dutton and sells for four dollars.

Eastern New York Birds

Birds of Eastern New York is a booklet that summarizes bird records and observations of the Schenectady-Albany-Troy area and is available from Guy Bartlett, Rosendale Road, R.D.1, Schenectady, for 40 cents, postpaid. Average arrival and departure dates, relative commonness and maximum dates are shown for 290 species, and birds are grouped as residents, transients, summer residents, etc. Another grouping tells what birds can be expected to arrive during various weeks of the year.

Soils Textbook

The Macmillan Company, New York, announced the publication of *The Nature and Properties of Soils,* a college text of edaphology by T. Lyttleton Lyon and Harry O. Buckman, professors of soil technology at Cornell University. The volume, priced at $3.50, is designed for the student interested in the nature and property of soils and their relationships to higher plants. A technical book, a working knowledge of inorganic chemistry by the reader is presupposed as well as some understanding of the colloidal state of matter.

Plants for the House

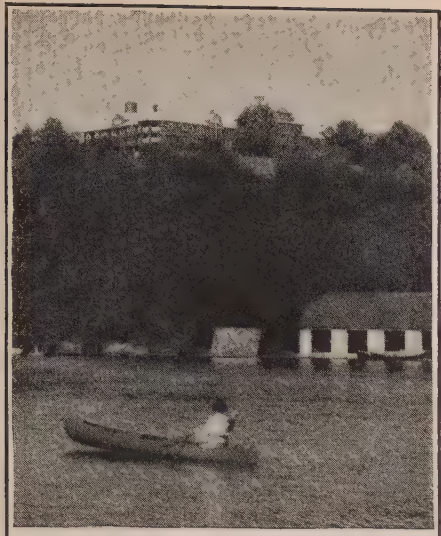
The method of caring for house plants is interestingly described in Botanical Leaflet number 20, published by the Field Museum of Natural History, Chicago. The 36-page leaflet contains 31 illustrations of the more popular plants grown indoors or in windowboxes, including such favorites as rubber plants, the Boston fern, the hyacinth, and the house hydrangea.

Reelfoot Lake Report

The Tennessee Academy of Science, Nashville, announces publication of the first annual report of the Reelfoot Lake Biological Station. The lake, located near Union City in the northwest corner of the state, is one of the largest bodies of fresh water in the south and is a large feeding ground for migratory waterfowl. Because of this and the fact that practically no studies have been made in the south on conservation of fish and game in such an area, this report is doubly valuable to the conservationists interested in the wildlife situation.

Tree Planting Record

Topping the 1935 record by more than sixty per cent, the Forest Service planted, during 1936, approximately 215,000,000 trees in National Forests in 26 states. Nearly ninety per cent of the total number was planted in National Forests in the Lake states and in the south. Michigan, with 78,197 plantings, led the states.



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(Continued from page 375)

its much hardier sisters, *C. adpressa* and *C. apiculata.* Even the early flowering jasmine, *Jasminum nudiflorum,* may be used in many sections of the country. A few horizontal wires fastened to the wall could be used for tying the branches of these shrubs in place, or possibly the neighbor would let you plant them above the wall and allow them to hang down over it.

These are but a few of the nooks and corners you may have. But what fun trying to find out what will grow in them, what satisfaction in turning unattractive spots into attractive ones. And then when we have our own fixed up, help our friend neighbor.

Beneath Trees

Shrubs—Coral-berry, fragrant sumac, Alpine currant, five-leaf aralia, snowberry. *Evergreen*—hemlock, Japanese yew, *Euonymus radicans. Ground covers*—English ivy, periwinkle (*Vinca*), *Euonymus radicans, Euonymus radicans coloratus, Ajuga, Sedum ternatum, Asperula odorata,* lily-of-the-valley.

North Side of House

Shrubs—Viburnum dentatum, Viburnum dilatum, Viburnum lentago, Viburnum lantana, Ibota privet, Regel privet, bush honeysuckle, or shrubs suggested above for planting beneath trees.

1–2 Ft. Between House and Sidewalk

Sun—Euonymus vegetus, Euonymus radicans, Sedum spectabile. Shade—Euonymus vegetus, Euonymus radicans, English ivy, plantain lily.

3–4 Ft. Between House and Sidewalk

Sun—Yucca, *Deutzia lemoinei, Philadelphus lemoinei. Shade*—Alpine currant, Chenault coral-berry, Japanese yew, mahonia, Regel privet.

Evergreens for North Side of House

Hemlock, Japanese yew, mahonia, *Euonymus vegetus.*

Cistern, Well Cover

Forsythia suspensa, Rosa wichuraiana, periwinkle (*Vinca*), *Euonymus coloratus,* bittersweet.

Top of Walls

Euonymus vegetus, climbing roses, snow-in-summer, *Saponaria ocymoides, Alyssum saxatile, Callirhoe, Cotoneaster adpressa, C. apiculata, Juniperus horizontalis.*

Base of Walls

English ivy, *Euonymus radicans, Euonymus radicans coloratus, Euonymus vegetus,* Boston ivy, *Ampelopsis lowii, Hydrangea petiolaris.*

Base of Trees

Grape hyacinth, crocus, narcissus, and wild flowers. To climb, use *Euonymus radicans* or *Euonymus vegetus, Ampelopsis lowii,* English ivy.

Beneath Grape Arbor

Narcissus, mertensia, grape hyacinth, wild flowers, meadowrue, *Pulmonaria,* plantain lily, *Iberis, Monarda, Aquilegia.*

(Continued on page 379)

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Birds at Sea

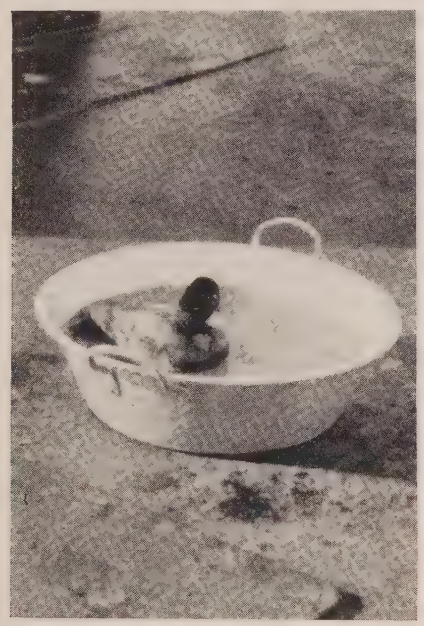
Editor, Nature Magazine:—

The enclosed bird pictures were taken while I was a member of the crew of the Standard Oil Tanker, *Royal Arrow*. This ship has been running coastwise between New York and Beaumont, Texas.

The duck came down on deck during a fairly heavy blow while we were in the Gulf of Mexico last November. It had suffered an injury to its right side, probably due to striking some part of the ship. It was placed in custody of our cook.

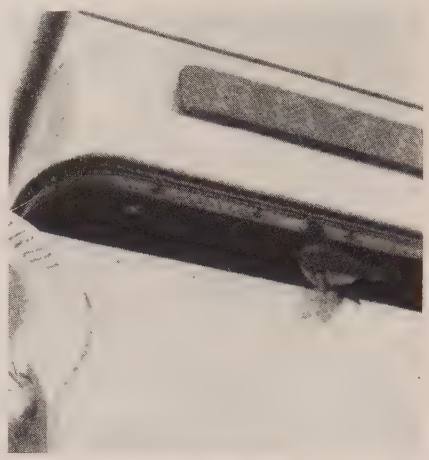
The cook attempted to set it to peeling potatoes like a stowaway should, but it refused to work and attempted to incite the crew to mutiny. Subdued, it was placed on a diet of corn meal and water. In order that it might navigate at will it was placed in a dishpan full of fresh water. It spent most of its time floating in its food pan.

The bird shown resting on the chart room rail came over the ship off the coast of Florida, a little south of Miami. I noticed it wheeling about the ship for some time before it attempted to come aboard. When it did try it didn't give enough of a heave to clear the ship's "necktie". It started to slip off the side and then with a great flapping of wings it hooked its bill inboard to hold its position secure. This was the cause of much laughter from those who saw it. Later in the evening a hawk came down on the railing over the bridge. When night had fallen it still was perched in chill reserve as far to starboard as it could get.



"IT SPENT MOST OF ITS TIME FLOATING IN ITS FOOD PAN"

One day I saw a little greenish bird on deck crouching dejectedly close to a summer tank. I could see that it was either sick or exhausted, and not knowing what to do for it I decided to leave it alone. Half an hour later I heard an excited cheeping coming from the wash room. "Boats", with several salty remarks about "some people's birds", came into our quarters and placed the bird on a table. You can carry a bird to water, but you can't make it drink, if you don't know how. I didn't know how, but I soon learned. I held the bird securely, but not too tightly, in my right hand and held my index finger of my left hand under the fresh water pump. I held my finger up till a small drop of water hung suspended on the under side. I then held my finger out to the bird. The brave little thing



ONE OF THE BIRD VISITORS OF THE ROYAL ARROW

pecked at it and got some water in its bill. I could see that it swallowed some. I repeated the process taking care not to force too much water on such a limited capacity. I believed I could see the bird brighten up after his drink.

In the evening I gave it some more water and went down to the mess room and stole half a dozen flies. (I'm sure they weren't missed.) I brought these up and held them out to the bird who pecked at my finger and the flies too. It was too dark to see whether or not they were eaten. Shortly afterward the bird flew away. It had suffered an injury to its leg.

It might not be too silly to advocate that all ships carry some small device by which these brave birds might get a drink of fresh water when they come down on deck after enduring more than one trying experience during their long flights. I have seen meadowlarks, mourning doves, catbirds and warblers on deck. I have seen what I took to be duck hawks perched high overhead. I remember seeing a hawk flying silently around the masts on a bright moonlight night.

One evening, during a very beautiful sunset, I saw two pelicans flying about the ship. The moon was casting a silver light through the puffy white clouds. These pelicans, brownish in color, struck all sorts of beautiful poses in their circlings. They would fly across the moon up near the crow's nest, giving a sort of wild spooky touch to the scene, and would then circle against the sunset. It would have been worth a trip to a tourist just to see those pelicans, the sunset and the moon, for that half hour.

One night, a little more than a day out of the Sabine Pass, the temperature dropped about thirty degrees. The water became pretty choppy and great streamers of fog blew along the water on a stiff breeze that was plenty raw.

We went out on deck to rig booms and I was stationed at the steam winch. When given the sign to turn on the steam I thought the winch would fall apart by the noise it made as it rattled, hissed and shuddered. While watching the winch I was surprised to see a fairly large bird struggle its way out of the interior of a cogwheel. I shut off the steam and then the fun began. "Boats" wanted to know why, fast. When I told him about the bird he said to try to get it out in one piece. No sooner said than done, only sooner. The bird did a Houdini and flew out over my head. It was brown and twenty inches tall. It had long legs and a long neck. When it walked it strolled.

Yours truly,

Thomas John Page

P.S.: This bird had probably got inside the winch to escape the cold. Birds have plenty of what it takes. T. J. P.

Value of Federal Documents

A report on United States Government publications, the result of studies made by Dr. L. F. Schmeckbeier, has been issued recently by the Brookings Institution, of Washington, D. C.

Federal publications, ranging from important scientific treatises to numberless press releases, now form a great library in themselves, and touch almost every field of human knowledge. As a rule they are authoritative and of permanent value. The report describes many guides, indexes and compilations designed to help the public to make use of these publications.

The author finds that there has been an increasing tendency during recent years to publish material designed to support projects, in progress or proposed, of the administration in power. Few persons who have encountered the growing mass of press releases, printed, multigraphed and mimeographed, issued from government offices during the past few years will deny their importance, or disagree with the conclusion of the author that: even "those embodying propaganda and glittering generalities in support of an undertaking likewise have their value in reflecting the character of the organization that issues them."

We have often wondered how some of our governmental units can bring themselves to continue to issue at intervals press releases whose conclusions bear no relation to similar matter on the same subject previously put out, or which may nullify the sentiments previously expressed. The chief underlying reason, we conclude, lies in the lack of background of the actual writers, and in some cases of their superiors, and in the failure to check the results before issuance to the public. However, the strength of those who have a background is hopelessly inadequate to cope with the vast volume of the precipitated propaganda that results from the combination of boundless energy, ignorance and carelessness, and the result is the "damning with faint praise" conclusion above cited. It points to a condition that is very discouraging.

Nebraska's State Tree

The State Legislature of Nebraska has designated the American elm as the official state tree. The choice was a logical one, as the elm is perhaps the most notable native tree of the state and grows in about two-thirds of it. Mrs. Benjamin G. Miller, of Crete, is the author of the resolution naming the elm.

Correction

The captions for the sphagnum and hair-cup mosses appearing on page 283 of our May rotogravure section were inadvertently transposed. The center picture on this page is the hair-cup moss, the lower picture being the sphagnum.

(Continued from page 377)

Among Evergreens Used as Foundation Planting

For Height—Tiger lily, Hanson lily, regal lily, Henry lily, *Nicotiana, Centaurea cyanus. For Ground Cover*—Periwinkle, *Phlox subulata, Ajuga, Dianthus plumarius* and *deltoides, Cerastium, Alyssum, Asperula odorata.*

In Walks and Terraces

Arenaria verna, Dianthus deltoides, Thymus serpullum, Herniaria glabra, Veronica rupestris, Sedum acre, Hypericum repens, Veronica repens. If shaded—use *Veronica filiformis, Mazus, Sedum nevii, Linaria equitriloba.*

Beneath Scraggly Old Shrubs

Lily-of-the-valley, *Asperula odorata, Euonymus radicans,* English ivy, Japanese spurge, wild flowers, *Ajuga, Sedum ternatum,* wild ginger, *Euonymus obovatus.*

Dry Banks

Rosa wichuraiana, Halls honeysuckle, *Callirhoe, Sedum sarmentosum, S. album, S. spurium, Phlox subulata, Cerastium.*

For Stone Steps

Hen-and-Chickens, *Sedum dasyphyllum, Sedum sexangulare, Sedum sieboldii, Arenaria verna, Herniaria glabra, Dianthus arvernense.*

Vine over Trellis or Garage

Clematis coccinea, Porcelain ivy, *Akebia, Actinidia,* scarlet runner bean, heavenly blue morning glory, cardinal climber.

Shrubs to Hide Something

Maack honeysuckle, European privet, *Viburnum lentago,* mock-orange, gray dogwood, silky dogwood, Amur maple.

For Front Walk Entrance

Japanese yew, *Euonymus vegetus, Euonymus radicans, Cotoneaster apiculata,* Alpine currant, *Ilex crenata microphylla.*

To Hide Compost Pile

Winter honeysuckle, Ibota privet, Ibolium privet, *Viburnum dentatum,* redtwig dogwood, Cornelian cherry, Rosemary willow.

Low Wet Spot

European privet, redtwig dogwood, ninebark, silky dogwood, *Monarda, Physostegia, Lythrum,* Joe-Pye weed, *Helenium autumnale,* cardinal flower.

Hide Down-spout

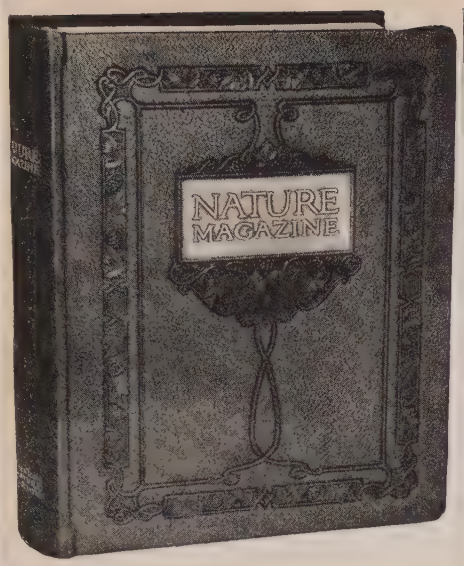
Hemlock, *Euonymus radicans, Euonymus vegetus, Clematis paniculata,* pussy willow, *Althea.*

Around Window Wells

Euonymus radicans, Euonymus vegetus, English ivy, teucrium.

Hide Coal Windows

Coral-berry, snowberry, *Spirea thunbergii,* ornamental grasses, *Hemerocallis.* (All of these may be tied back if necessary.)



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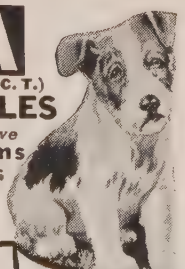

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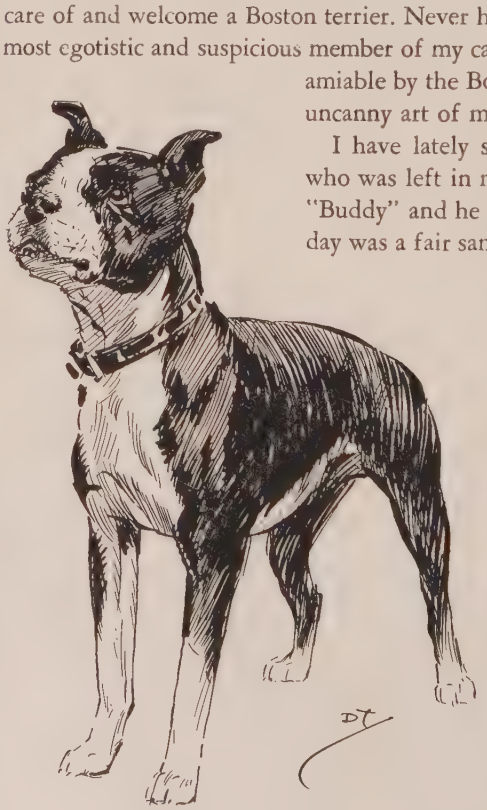
Fond of all dogs and having many of my own constantly around me, I am nevertheless shy of accepting the dogs of my friends as house-guests in emergencies. Painful experience has taught me that jealousy is a strong characteristic of nearly all pet animals and I am not one to invite trouble. But never do I refuse to take care of and welcome a Boston terrier. Never have I known trouble with him. The most egotistic and suspicious member of my canine staff is disarmed and rendered amiable by the Boston's radiant good-fellowship and uncanny art of making and keeping friends.



I have lately said *au revoir* to a merry specimen who was left in my care for a month. His name was "Buddy" and he arrived early one morning. His first day was a fair sample of his abilities.

He wasted no time at all in getting acquainted. Ten minutes after he had entered the house he had been through every room, inspected every corner, enjoyed a biscuit or two, found where the balls were kept, licked my hand vigorously and suggested that we play a game. When my energy and my spare time gave out, he made himself so agreeable to a neighbor who was dogless that she offered to take him for a walk. She came back, hours later, looking pleased and said that Buddy helped with the shopping and insisted on carrying the package.

He stayed home long enough on that first day to share my lunch. Then, when a small boy called to repay the loan of a nickel, Buddy suggested a ball game to him.

Buddy's enthusiasms knew no bounds. He yelped, howled and whined with delight and joy at every turn. He licked humans and animals alike to the limit of their tolerance. In fact, when he got all through and out of sight I imagined that somewhere he was singing Chevalier's famous song—"I got lots of love but nobody's using it now!"

If Buddy were able to write letters I think that the greater part of his epistles would be occupied with numerous crosses!

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